MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for April, 1900, is based on reports from about 3,103 stations furnished by employees and voluntary observers, classified as follows: regular stations of the Weather Bureau, 158; West Indian service stations, 12; special river stations, 132; special rainfall stations, 48; voluntary observers of the Weather Bureau, 2,562; Army post hospital reports, 27; United States Life-Saving Service, 9; Southern Pacific Railway Company, 96; Canadian Meteorological Service, 32; Mexican Telegraph Service, 20; Mexican voluntary stations, 7; Mexican Telegraph Company, 3. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Hawaiian Government Survey, Honolulu; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Señor A. M. Chaves, Director-General of Mexican Telegraphs; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Commander Chapman C. Todd, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to conform generally to the modern international system of standard meridians, one hour apart, beginning with Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are sometimes corrected to agree with the eastern standard; otherwise, the local meridian is mentioned.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

During the month of April, 1900, unusually high atmospheric pressure over the Lake region and Ohio Valley and low pressure in the Southwest, were attended by heavy rains in the Southern and southwestern States, and by cool and dry weather in the north-central and northeastern States. In the Gulf States and lower Mississippi Valley considerable damage was caused by floods in the smaller streams.

In Texas heavy rain began during the night of the 5th and continued until the 7th. On the afternoon of the 7th the great granite dam across the Colorado River, two miles above Austin, gave way causing the loss of several lives and destroying a great amount of property. The second period of heavy rain began in the middle and east Gulf States on the 10th, and continued during the 11th, after which an interval of fair weather prevailed until the 15th, when rain set in along the middle and west Gulf coast. From the 16th to the 18th remarkably heavy rains fell in the middle Gulf States and the lower Mississippi Valley, causing washouts on railroads, and an immense amount of damage to property and crops. At Meridian, Miss., the dam of the waterworks gave way on the 16th, and at Bessemer, Ala., the reservoir of the waterworks broke. Rains continued at intervals during the remainder of the month in the Southern States, and on the 27th exceptionally heavy downpours caused damage at points along the Brazos and Colorado rivers, Texas. At Waco, Tex., a number of persons were drowned, and the property loss was placed at $150,000. In the various rivers and streams of Texas the loss by flood was estimated at $3,000,000 to $5,000,000.

In districts where the river and flood service of the Weather Bureau has been organized warnings were issued of the floods of the month. The extension of this service over Texas was begun last year and will be improved as rapidly as available funds will permit. Notwithstanding the lack of data and information regarding the rivers of that section the floods of Texas were, in some degree, anticipated by warnings. On the 7th interests along the Colorado River south of Austin were advised of a probable sudden and decided rise in that river. On the 27th all points along the Brazos and Colorado rivers were warned of a rise, and freshets for the smaller streams of Texas were forecast. In Alabama the damage by flood along the Tombigbee and Black Warrior rivers was placed at $1,500,000, and property to the estimated value of $250,000 was saved by the Weather Bureau flood warnings sent from Mobile on the 17th. On the 18th Johnsonville, Tenn., was warned by the Weather Bureau office at Cairo, Ill., that the river would rise rapidly at that place to a stage approaching 26 feet within two or three days. Heavy rains were forecast for the 19th and 20th, and these rains caused a further rise at Johnsonville to a stage of 29 feet on the morning of the 23d. No special damage was caused.

The damaging frosts of the month were successfully forecast. In connection with the heavy frosts of the 1st in the interior of the middle and east Gulf and South Atlantic States timely warnings were widely distributed and were of

great benefit to early truck and berry growers. Heavy frost on the 5th in the States of the Ohio Valley resulted in little or no damage, as fruit trees were backward in budding. During the second week in April frost occurred in central and northern California, causing some damage to grape vines and tender vegetation. In the north Pacific coast States frost caused heavy damage to fruit.

No severe wind storms occurred on the Great Lakes or the seacoasts of the United States during the month. Several schooners and fishing boats were reported wrecked by high wind on the Yucatan coast on the 23d. During the afternoon of the 6th high wind caused some damage on the north Pacific coast.

CHICAGO FORECAST DISTRICT.

Warnings were sent of the heavy snowstorms of the month in the middle Rocky Mountain region.

No storm that seriously affected navigation passed over the upper Lake region during the month.—*H. J. Cox, Professor.*

SAN FRANCISCO FORECAST DISTRICT.

The showers of the early part of the month were successfully forecast.

Reports of injury by frost during the second week of April were much exaggerated.

About the middle of the month some interesting experiments were made in forecasting fog for the San Francisco Bay region with a good measure of success..—*A. G. McAdie, Forecast Official.*

PORTLAND, OREG., FORECAST DISTRICT.

Warnings were issued for the only severe storm of the month, which occurred on the 6th. This storm wrecked the new wharfs of the Dunsmuir collieries at Ladysmith, near Victoria, B. C., entailing a loss of over $10,000.

The severe frosts of the month were successfully forecast. But little attention was paid to these warnings, although the frosts damaged fruit in Oregon alone to the amount of many thousands of dollars. The Oregonian editorially commented upon the apathy of the fruit growers in this connection, as follows:

> Are not our farmers and fruit growers sufficiently intelligent to take advantage of the work of agricultural experiment stations, of the Weather Bureau and other scientific agencies, by which they gain a livelihood and feed the world? Is it their only privilege to grumble at the payment of taxes that support such institutions? It is to be hoped that the fruit growers are in a receptive condition of mind and that the lesson will now be learned that untimely frosts may be guarded against without money and without price.

E. A. Beals, Forecast Official.

HAVANA FORECAST DISTRICT.

No general storms occurred during the month and no special warnings were issued.

Severe local storms occurred at points in central and western Cuba on the 26th, and in eastern Cuba on the 27th—*W. B. Stockman, Forecast Official.*

AREAS OF HIGH AND LOW PRESSURE.

During the month there were eight highs and eleven lows which could be definitely traced (see Charts I and II). A brief description of some of their most prominent characteristics is given herewith.

Highs.—None of the highs moved entirely across the country. Those which originated, or were first observed in the extreme West, were dissipated before or by the time the one hundredth meridian was reached, and No. II did not leave the Pacific coast. No. I originated in Manitoba, moved slowly southeastward, and disappeared in central Tennessee. Nos. VI and VII originated in Tennessee and Kentucky, respectively, and, after very irregular courses, moved into the Atlantic Ocean by way of Cape Breton Island.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	3, a. m.	50	100	5, p. m.	36	87	1,350	2.5	540	22.5
II	2, a. m.	34	118	4, a. m.	45	123	950	2.0	475	19.8
III	7, p. m.	41	124	10, a. m.	50	100	1,800	2.5	720	30.0
IV	14, a. m.	45	123	17, a. m.	50	100	1,475	3.0	492	20.5
V	17, a. m.	40	115	17, p. m.	40	105	550	0.5	1,100	45.8
VI	14, a. m.	35	85	18, a. m.	46	60	1,775	4.0	444	18.5
VII	19, a. m.	37	87	22, p. m.	46	60	2,450	3.5	700	29.2
VIII	28, a. m.	51	114	30, a. m.	40	105	1,400	2.0	700	29 2
Sums							11,750	20.0	5,171	215.5
Mean of 8 paths							1,469		646	26.9
Mean of 20 days									588	24.5
Low areas.										
I	1, p. m	42	88	4, a. m.	47	65	1,525	2.5	610	25.4
II	1, a. m.	43	123	14, p. m. 12, a. m.	48 43	69 87	6,300 4,750	13.5 11.0	467 432	19.5 18.0
III	1, a. m.	48	122	3, a. m.	54	114	700	2.0	350	14.6
IV	6, a. m.	33	65	7, p. m.	46	60	1,050	1.5	700	29.2
V	12, a. m.	43	123	20, a. m.	46	60	4,075	8.0	509	21.2
VI	17, p. m.	53	115	18, p. m.	53	105	400	1.0	400	16.7
VII	18, a. m.	26	97	21, a. m.	40	91	1,400	3.0	467	19.5
VIII	19, p. m.	50	110	21, a. m.	44	103	540	1.5	360	12.5
IX	20, p. m. 21, p. m.	43 48	112 123	22, p. m.	46	106	1,150 950	2.0 1.0	575 950	24.0 39.6
X	25, p. m.	37	100	25, p. m.	53	105	1,160	2.0	580	24.2
XI	28, p. m.	50	97	30, a. m.	46	73	1,225	1.5	817	34.0
Sums							28,825	50.5	7,217	298.4
Mean of 13 paths							2,217		555	23.1
Mean of 50.5 days									571	23.8

Lows.—The movements of the lows were extremely erratic throughout the month. No. I originated over northeastern Illinois, moved eastward to the Massachusetts coast, and thence northward. No. II was a remarkable development, occupying thirteen and one-half days for the movement of the main depression across the country, and traversing a path 6,300 miles in length. It originated on the Oregon coast on the morning of the 1st, reaching the Texas panhandle by the evening of the 5th; from this time until the morning of the 10th it shifted irregularly between the Texas coast and southwestern Kansas, again touching the Texas panhandle on the evening of the 8th; it was joined on the morning of the 8th by a secondary depression which had started from western Colorado on the evening before; by the morning of the 11th the center of disturbance had reached central Tennessee, by way of southwestern Mississippi, and there divided, the principal depression moving southward to central Alabama, and thence northeastward and northward to the upper Saint Lawrence Valley. The offshoot continued northward and was lost in western Lower Michigan. During the time this low was moving over Texas there were heavy and persistent rains over the eastern portion of that State. No. III did not move south of the forty-eighth parallel, nor east of the one hundred and fourteenth meridian. No. IV moved northward over the Atlantic Ocean by way of Bermuda, passing off through Newfoundland. No. V originated on the Oregon coast, and, after sending an offshoot to Alberta, moved to western Texas, and

thence northeastward and eastward by way of the upper Lakes to Cape Breton Island, occupying eight days in its passage.

No particular interest attaches to the remaining lows except Nos. VII and X. No. X developed an extremely rare north to west movement from central Kansas to the Saskatchewan Valley, and No. VII also exhibited a westward tendency after reaching southern Mississippi.—*H. C. Frankenfield, Forecast Official.*

RIVERS AND FLOODS.

River affairs along the great systems, the Missouri, Mississippi, and Ohio, were quiet and uneventful during the month. There was more water in the Mississippi and Upper Missouri, and considerably less in the Lower Missouri and Ohio than during March, 1900. Good navigable stages were available throughout the month. In the Mississippi between Helena, Ark., and Vicksburg, Miss., there was an average stage of about 30 feet. When compared with those of April, 1899, the stages show a considerable decrease.

The Lower Tennessee was in flood from the 18th to the 28th, inclusive, on account of heavy rains over its middle watershed, reaching a stage of 19.2 feet at Florence, Ala., 3.2 feet above the danger line, and a stage of 29.1 feet at Johnsonville, Tenn., 8.1 feet above the danger line. Warnings were issued when necessary, and no damage of consequence was reported except the loss of a number of cross-ties at Florence, Ala.

In the rivers of the South Atlantic and the Gulf States matters were more interesting, and the conditions varied from moderate floods in the Carolinas to enormous ones in Mississippi and western Alabama. The Cape Fear River at Fayetteville, N. C., reached 44 feet on the 21st and 22d, 6 feet above the danger line, and the rivers of South Carolina were generally above the flood limits at various times during the third decade of the month. The rivers of northern Georgia were also moderately high, and those of eastern Alabama decidedly so, the Alabama River rising to 36.5 feet at Montgomery, Ala., 1.5 feet above the danger line, and to 41 feet at Selma, Ala., 6 feet above the danger line. Ample warnings of these rises were uniformly given, and no reports of serious loss or damage have been received.

Very severe and disastrous floods occurred in western Alabama and southern Mississippi. The Tombigbee and Black Warrior rivers in Alabama reached the highest stages on record, and the total damage amounted to about $1,500,000. The following report of this flood was prepared by Mr. W. M. Dudley, official in charge of the Weather Bureau office at Mobile, Ala.:

The rivers in this district, the Tombigbee and Warrior, were at good navigable stages from the first of April, 1900, marked falls being checked by frequent rains, especially on the 10th and 11th, when general and heavy rainfalls, ranging from one to over three inches, occurred over the watershed, causing marked rises in the Upper Tombigbee and Warrior rivers, exceeding the danger-line stage at Tuscaloosa, Ala., on the morning of the 12th, the rise being 26.5 feet to a stage of 52.8 feet. This rise continued until the morning of the 16th, when a slight fall began at stations on the Upper Tombigbee and Warrior rivers, with a continued rise on the Lower Tombigbee from Demopolis, Ala., south.

With the stages already abnormally high, excessive and remarkable rainfalls occurred over the watershed on the 16th and 17th. The following are some of the amounts recorded: Columbus, Miss., 4.50 inches; Demopolis, Ala., 9 inches; Tuscaloosa, Ala., 7.15 inches; Livingston, Ala., 10 inches; Macon, Miss., 5.20 inches; Waynesboro, Miss., 3 inches; Warrior, Ala., 3.86 inches.

In anticipation of an unusual flood, warnings were telegraphed on the morning of the 17th to the river observers at Columbus, Miss., and Demopolis and Tuscaloosa, Ala., predicting a 40-foot stage at Columbus, Miss., and a 70-foot stage at Demopolis and Tuscaloosa, Ala., on this rise, that at Demopolis to occur by the close of the week. These warnings were redistributed from these points by mail to places along the rivers, and were instrumental in saving both life and property, particularly live stock, but little of which was lost. Attention is invited to the following extract from a letter of our river observer, Mr. George E. Pegram, Demopolis, Ala.:

"I sent warnings to the following places: Pleasant Ridge, Tishabee, and Forkland, in Green County; Belmont, McDowells, and Whitfield, in Sumpter County, and Jefferson and Myrtlewood in Marengo County, all postoffices, and near the river. The warning was heeded by all but two persons, and all the stock was saved, except by those two, one of whom lost $2,000, and the other about $300 worth of stock."

The steamer *Hattie B. Moore*, which left Mobile, Ala., on the evening of the 17th, for Demopolis, Ala., distributed the warnings to all points along the river, so that the people were duly informed of the impending flood, as the steamer left this end and reached Demopolis before the effect of the flood was felt in the lower river. In this connection is given herewith a letter from Capt. E. B. Kirkbride, General Manager of the Warrior and Bigbee River Packet Company:

"MOBILE, ALA., *May* 12, 1900.

"Mr. W. M. DUDLEY,
"*Weather Bureau, Mobile, Ala.*

"DEAR SIR: On Tuesday morning, April 17, 1900, you reported to this office a rainfall of 4.50 inches at Columbus, 9 inches at Demopolis, and 7.15 inches at Tuscaloosa. At same time you predicted a dangerously high stage of water, resulting from a combination of the good stage of water then in river and the excessive rainfall. Acting upon this prediction, the worth of which had been practically demonstrated on several previous occasions, I requested Captain Stone of steamer *Hattie B. Moore*, leaving that evening for points along the Bigbee and Warrior rivers, to notify the planters that the largest flood of many years was coming down the river and to prepare for it.

"Owing to the quick transmittal of this information many cattle were saved and possibly the loss of human life prevented, whereas in former years such a flood would have caused the loss of several lives and thousands of heads of cattle. Permit me to congratulate you upon the part you have played in this humanitarian effort of the Government.

"I remain, with much respect, yours, truly,
"(Signed) E. B. KIRKBRIDE,
"*Manager.*"

As a result of these excessive rainfalls the rivers rose rapidly, attaining a maximum stage of 27.6 feet at Columbus, Miss., on the 19th, but no damage was done, save in the delay of crops, where lowlands were submerged.

At Tuscaloosa, Ala., on the Black Warrior, the river rose suddenly from a stage of 37.1 feet on the morning of the 16th, to 63.0 feet on the morning of the 17th, reaching a maximum stage of 65.0 feet on morning of 18th, which is 2.4 feet above the previous highest flood on record (April, 1892). The statement of Mr. W. S. Wyman, river observer at this point, is appended:

"TUSCALOOSA, ALA., *May* 11, 1900.

"Mr. W. M. DUDLEY,
"*Official in charge, Mobile, Ala.*

"SIR: I have the honor to submit the following report of the flood of April 16, 1900, in this district:

"On April 16 there occurred the highest and most violent flood on the Black Warrior River ever known in this region. The rainfall was unprecedented, being 8.40 inches at Tuscaloosa, Ala., in a continuous rain lasting about thirty-two hours.

"When this rainfall occurred the river at Tuscaloosa was falling from a recent rise and was over 37 feet on the gage. It began rising again on the afternoon of the 16th and rose very rapidly during the night. It rose less rapidly next morning and culminated at 3 p. m. at 65.16 feet, being 2.40 feet above the previous highest flood on record (April, 1882). Residents below Tuscaloosa report this flood to have been 1½ to 3 feet higher than any previous one within memory. The river began to fall about 4 p. m. April 17, and fell about 1 foot during the night.

"The flooded area is estimated to have been about 8 or 10 square miles, and the damage done consisted mainly in the loss of two iron bridges, many wooden bridges, fences, small houses, lumber, small boats, fertilizer, etc. The damage to crops will probably reach $75,000.

"Flood warnings were mailed at 4 p. m. on April 16 to nine points in Alabama, and it is thought that about $10,000 worth of stock, etc., were saved by them.

"Very respectfully,
"(Signed.) W. S. WYMAN,
"*River Observer.*"

This great volume of water had yet to come down to Demopolis, Ala., at the junction of the Upper Tombigbee and Black Warrior rivers. The rise was not so sudden, but continued steadily to the 22d, when the maximum stage of 68.7 feet was attained, exceeding the previous highest stage (66.0 feet in April, 1874,) by 2.7 feet.

The following is quoted from the report of the river observer at that point:

"The area of land covered by the flood in my district on the Tombigbee and Black Warrior rivers was about seven miles wide, and much damage was done, as most of the overflowed land had been planted.

Estimated loss to the planters between $250,000 and $300,000; I mean by this, loss of stock, negro cabins, corn cribs, and growing corn, which had to be replanted. Land was badly washed and fertilizer destroyed. Nearly every negro cabin was washed away, and two planters lost about 700 bushels of corn each. All the planters having creeks on their places emptying into the rivers were as badly damaged as the river planters, as the creeks overflowed their banks and covered the bottom lands, all of which had been planted. This flood will throw the river planters behind about one month."

The flood wave, being fed by overflowed creeks and small streams, moved slowly southward, carrying with it any obstructions which happened to be in the path, most bridges being carried away by the pressure of the timber coming down in the torrent, and lowlands became inundated, menacing the lives and property of residents, and the timber interests situated thereon. Most of the damage reported was destruction of planted crops, of which vast quantities were destroyed, or badly injured by water. No reports of serious loss to the timber and sawmill interests have been received. The representatives of these interests kept in daily communication with this office, and any probable loss was averted by the warnings.

In many instances the railroad track and ties were washed away, the breaks on the Mobile and Ohio Railroad were many, interrupting transportation, and no trains were run over this road between Meridian, Miss., and Mobile, Ala., for about a week or ten days. Telegraphic communication was interrupted, owing to washing away of bridges, etc. Repairs to railroad and telegraph property are still in progress. Several spans (wooden) of the Louisville and Nashville Railroad Bridge at Pascagoula, Miss., were washed away, as a result of a timber gorge.

It is estimated the damage done by the flood in this district will probably reach one million and a half dollars, and that the amount of property saved from destruction by the warnings of the Bureau, will aggregate a quarter of a million dollars.

The rivers were falling rapidly at the close of the month, and were below the danger line, save at Demopolis and points below on the Lower Tombigbee River.

In southern Mississippi, where the land is quite level, the enormous rains of the second decade of the month, caused general disaster to everything that could possibly be affected. In many places the rainfall was vastly greater than had ever before been known, and all streams were higher by several feet than the greatest previous record. The Pearl and Black rivers were especially high. Several lives were lost; many entire towns were flooded; railroad traffic of every description was totally suspended for many days; hundreds of bridges, both railroad and highway, were carried away; thousands of heads of stock were drowned; hundreds of barns and houses destroyed, and tens of thousands of acres of lands overflowed, totally destroying the growing crops. It is impossible to give an accurate estimate of the amount of damage done by this flood. It was at least seven or eight millions of dollars, about equally divided between private citizens and the railroad companies.

A detailed report of the great Colorado River flood in Texas during this month has been made by Dr. I. M. Cline, official in charge of the Weather Bureau office at Galveston, Tex., and is printed in another portion of this REVIEW.

The highest and lowest water, mean stage, and monthly range at 131 river stations are given in Table XI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Forecast Official.*

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

Alabama.—The mean temperature was 62.0°, or about 0.5° above normal; the highest was 91°, at Bermuda on the 24th, and the lowest, 24°, at Oneonto on the 1st. The average precipitation was 9.06, or about 5.00 above normal; the greatest monthly amount, 19.64, occurred at Eutaw, and the least, 3.27, at Rock Mills.

The precipitation was decidedly excessive from west-central to northeastern portions of the State, causing destructive floods in western counties, inundating large areas of planted lands, which had to be entirely replanted.—*F. P. Chaffee.*

Arizona.—The mean temperature was 57.7°, or 5.0° below normal; the highest was 102°, at Fort Mohave on the 18th, and the lowest, 10°, at Flagstaff on the 24th. The average precipitation was 1.37, or 0.54 above normal; the greatest monthly amount, 4.21, occurred at Flagstaff, while none fell at Cochise and Russellville.—*W. G. Burns.*

Arkansas.—The mean temperature was 62.2°, or 0.6° below normal; the highest was 96°, at Conway on the 23d, and the lowest, 24°, at Witts Spring on the 3d, and at Pond on the 12th. The average precipitation was 4.98, or 0.18 above normal; the greatest monthly amount, 10.06, occurred at Rison, and the least, 1.51, at Forrest City.—*E. B. Richards.*

California.—The mean temperature of the State, obtained by weighting the reports from 189 stations, so that equal areas have about equal weight, was 53.9°, which was 2.8° below the April normal for the State, as determined from 157 records; the highest was 102°, at Ogilby, San Diego County, on the 1st, and the lowest, 4°, at Bodie, Mono County, on the 10th. The average precipitation for the State, as determined by the records of 190 stations, was 2.14; the excess, as indicated by reports from 157 stations which have normals, was 0.25; the greatest monthly amount, 8.59, occurred at Delta, Shasta County, while none fell at Ogilby and Palm Springs.—*Alexander G. McAdie.*

Colorado.—The mean temperature was 42.3°, or 2.3° below normal; the highest was 84°, at Lamar on the 2d, and the lowest, 9° below zero, at Longs Peak. The average precipitation was 5.97, or more than double any previous record for April; the greatest monthly amount, 16.52, occurred at Lake Moraine, and the least, 0.79, at Rangely.—*F. H. Brandenburg.*

Florida.—The mean temperature was 70.0°, or normal; the highest was 93°, at Archer on the 17th, Clermont on the 12th, 13th, 23d, and 28th, Earnestville on the 11th and 17th, Eustis on the 11th, and Nocatee on the 12th; the lowest was 33°, at Deland on the 6th. The average precipitation was 4.49, or 2.10 above normal; the greatest monthly amount, 13.05, occurred at Middleburg, and the least, 0.75, at Sebastian.—*A. J. Mitchell.*

Georgia.—The mean temperature was 64.3°, or about normal; the highest was 92°, at Statesboro on the 28th, and the lowest, 23°, at Clayton and Dahlonega on the 1st. The average precipitation was 5.72, or 2.36 above normal; the greatest monthly amount, 10.50, occurred at Toccoa, and the least, 2.77, at Dublin.—*J. B. Marbury.*

Idaho.—The mean temperature was 47.5°, or 2.0° above normal; the highest was 89°, at Hagerman on the 1st, and the lowest, 20°, at Atlanta on the 3d. The average precipitation was 2.05, or 0.63 above normal; the greatest monthly amount, 4.27, occurred at American Falls, and the least, 0.53, at Challis.—*S. M. Blandford.*

Illinois.—The mean temperature was 53.5°, or nearly normal; the highest was 88°, at several stations on different dates, and the lowest, 19°, at Scales Mound on the 10th. The average precipitation was 1.53, or 1.56 below normal; the greatest monthly amount, 3.95, occurred at at Round Grove, and the least, 0.38, at Monticello.—*M. E. Blystone.*

Indiana.—The mean temperature was 52.4°, or nearly normal; the highest was 88°, at Greensburg on the 7th, at Prairie Creek on the 29th and at Fairmount on the 30th, and the lowest, 20°, at Bluffton on the 10th. The average precipitation was 1.64, or 1.62 below normal; the greatest monthly amount, 2.92, occurred at Bluffton, and the least, 0.13, at Bedford.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 52.2°, or 2.7° above normal; the highest was 89°, at Hampton on the 27th, and at Redoak on the 28th, and lowest, 19°, at Mt. Pleasant on the 1st. The average precipitation was 2.67, or slightly below normal; the greatest monthly amount, 6.62, occurred at Thurman, and the least, 0.43, at Batavia.—*J. R. Sage, Director; G. M. Chappel, Assistant.*

Kansas.—The mean temperature was 55.8°, or nearly normal; the highest was 88°, at Medicine Lodge on the 26th, and at Oswego on the 9th and 27th, and the lowest, 10°, at Scott on the 10th. The average precipitation was 4.12, or 1.68 above normal; the greatest monthly amount, 6.90, occurred at Olathe, and the least, 2.10, at Sedan.—*T. B. Jennings.*

Kentucky.—The mean temperature was 56.2°, or 0.8° below normal; the highest was 90°, at Alpha on the 29th, and the lowest, 15°, at Middlesboro on the 1st. The average precipitation was 2.15, or 1.52 below normal; the greatest monthly amount, 3.92, occurred at Mount Hermon, and the least, 1.04, at Catlettsburg.—*H. B. Hersey.*

Louisiana.—The mean temperature was 67.0°, or 0.7° below normal; the highest was 96°, at Libertyhill on the 26th, and the lowest, 30°, at Mansfield on the 1st and at Plain Dealing on the 12th. The average precipitation was 9.82, or 5.41 above normal; the greatest monthly amount, 17.42, occurred at Amite, and the least, 2.30, at Minden.—*W. T. Blythe.*

Maryland and Delaware.—The mean temperature was 52.5°, or 0.3° above normal; the highest was 86°, at Hancock on the 30th, and the lowest, 16°, at Sunnyside on the 5th. The average precipitation was 1.95, or 1.31 below normal; the greatest monthly amount, 3.65, occurred at Prince Fredericktown, and the least, 0.64, at Cumberland, Md.—*F. J. Walz.*

Michigan.—The mean temperature was 46.0°, or 2.3° above normal; the highest was 85°, at Sidnaw on the 28th, and the lowest, 6°, at Wetmore on the 3d. The average precipitation was 1.71, or 0.51 below normal; the greatest monthly amount, 3.15, occurred at Mackinaw City and Cheboygan, and the least amount, 0.30, occurred at Lincoln.—*C. F. Schneider.*

Minnesota.—The mean temperature was 49.5°, or 4.9° above normal; the highest was 90°, at Hallock on the 20th, and the lowest, 12°, at Koochiching on the 13th. The average precipitation was 1.47, or 1.17 below normal; the greatest monthly amount, 3.25, occurred at Luverne, and the least, 0.28, at Alexandria.—*T. S. Outram.*

Mississippi.—The mean temperature was 65.0°, or nearly normal; the highest was 93°, at Leakesville on the 25th, and the lowest, 27°, at Louisville and Ripley on the 1st. The average precipitation was 11.50, or 7.57 above normal; the greatest monthly amount, 19.15, occurred at Natchez, and the least, 4.82, at Austin.

On the 15th, 16th, and 17th the precipitation was excessive, being the heaviest on record in many places. The following 24-hourly amounts are reported: Windham, 10.80; Fayette, 9.25; Bay St. Louis, 8.77; Magnolia, 8.41; Canton, 8.25; and Port Gibson, 7.64. This storm covered the southern and middle portion of the State; streams were swollen out of their banks; bridges, fences, houses, railroads, etc., were carried away, and in Lauderdale and Hinds counties several persons were drowned, the water coming upon them too fast to admit of escape. Thousands of acres of cotton and corn were laid waste.—*H. E. Wilkinson.*

Missouri.—The mean temperature was 56.6°, or 0.8° above normal; the highest was 89°, at Wylie on the 9th, Appleton City on the 26th, and Jefferson City on the 29th, and the lowest, 21° at Potosi, on the 5th. The average precipitation was 3.37, or 0.48 below normal; the greatest monthly amount, 6.76, occurred at Wheatland, and the least, 1.34, at Hannibal.—*A. E. Hackett.*

Montana.—The mean temperature was 47.0°, or 2.8° above normal; the highest was 88°, at Glendive on the 20th, and the lowest, 16°, at Ekalaka on the 2d. The average precipitation was 2.28, or 1.15 above normal; the greatest monthly amount, 12.27, occurred at Bigtimber, and the least, 0.77, at Ovando.—*E. J. Glass.*

Nebraska.—The mean temperature was 51.5°, or 2.1° above normal; the highest was 87°, at Franklin on the 23d, and the lowest, 17°, at Kimball on the 10th. The average precipitation was 4.68, or 2.10 above normal; the greatest monthly amount, 9.44, occurred at Fairfield, and the least, 0.95, at Merriman.—*G. A. Loveland.*

Nevada.—The mean temperature was 43.8°, or about 3.3° below normal; the highest was 82°, at Humboldt and Sodaville on the 18th, and the lowest, 10°, at Fenelon on the 8th and at Palmetto on the 10th. The average precipitation was 1.98, or about 1.16 above normal; the greatest monthly amount, 4.52, occurred at Ely, and the least, trace, at Mill City.—*J. H. Smith.*

New England.—The mean temperature was 44.5°, or 1.2° below normal; the highest was 83°, at North Bridgton, Me., and Westboro, Mass., on the 30th, and the lowest, 8°, at Berlin Mills, N. H., on the 5th. The average precipitation was 1.82, or 1.19 below normal; the greatest monthly amount, 4.64, occurred at Vineyard Haven, Mass., and the least, 0.35, at Flagstaff, Me.—*J. W. Smith.*

New Jersey.—The mean temperature was 50.8°, or 1.7° above normal; the highest was 82°, at Paterson on the 30th, and the lowest, 17°, at Toms River on the 11th. The average precipitation was 2.29, or 1.13 below normal; the greatest monthly amount, 3.03, occurred at Plainfield, and the least, 1.59, at Trenton.—*E. W. McGann.*

New Mexico.—The mean temperature was 49.1°, or 3.9° below normal; the highest was 86°, at Horse Springs on the 1st, and the lowest, 2°, at Winsors on the 12th. The average precipitation was 1.41, or 0.86 above normal; the greatest monthly amount, 7.19, occurred at Folsom, while at Cambray, Deming, and Engle none was recorded.—*R. M. Hardinge.*

New York.—The mean temperature was 45.2°, or 1.2° above normal; the highest was 83°, at Schenectady on the 30th, and the lowest, 9°, at Moria on the 14th. The average precipitation was 1.43, or 1.02 below normal; the greatest monthly amount, 3.26, occurred at Mohonk Lake, and the least, 0.27, at Ticonderoga.—*R. G. Allen.*

North Carolina.—The mean temperature was 58.0°, or nearly normal; the highest was 90°, at Southern Pines on the 23d, and the lowest, 15°, at Highlands on the 1st. The average precipitation was 4.74, or 0.97 above normal; the greatest monthly amount, 10.20, occurred at Highlands, and the least, 1.85, at Wilmington.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 49.3°, or 8.3° above normal; the highest was 93°, at Minto on the 20th, and the lowest, 11°, at St. John on the 15th. The average precipitation was 0.90, or 1.78 below normal; the greatest monthly amount, 2.28, occurred at Forman, and the least, trace, at Minnewaukan, Portal, and Willow City.—*B. H. Bronson.*

Ohio.—The mean temperature was 50.1°, or nearly normal; the highest was 87°, at Portsmouth on the 29th, and the lowest, 15° at Hillhouse on the 9th. The average precipitation was 1.89, or 1.01 below normal; the greatest monthly amount, 4.04, occurred at Wauseon, and the least, 0.32, at Hanging Rock.—*J. Warren Smith.*

Oklahoma and Indian Territory.—The mean temperature was 61.3°, or nearly normal; the highest was 92°, at Jefferson and Prudence on the 3d, and the lowest, 25°, at Beaver on the 11th. The average precipitation was 4.44, or 1.46 above normal; the greatest monthly amount, 9.55, occurred at Healdton, and the least, 1.72, at Hartshorne.—*C. M. Strong.*

Oregon.—The mean temperature was 50.1°, or 1.5° above normal; the highest was 89°, at Aurora on the 29th, and the lowest, 10°, at Silverlake on the 8th. The average precipitation was 2.19, or 1.02 below normal; the greatest monthly amount, 7.8°, occurred at Glenora, and the least, 0.10, at Siskiyou.—*E. A. Beals.*

Pennsylvania.—The mean temperature was 49.2°, or 1.3° above normal; the highest was 90°, at Derry Station on the 30th, and the lowest, 13°, at Saegerstown on the 10th. The average precipitation was 1.57, or 1.57 below normal; the greatest monthly amount, 2.80, occurred at Somerset, and the least, 0.60, at Franklin.—*T. F. Townsend.*

South Carolina.—The mean temperature was 62.4°, nearly normal; the highest was 90°, at Gillisonville on the 29th, and the lowest, 24°, at Clemson College, Greenville, and Holland on the 1st. The average precipitation was 5.41, or 2.38 above normal; the greatest monthly amount, 10.32, occurred at Shaws Fork, and the least, 2.35, at Georgetown.—*J. W. Bauer.*

South Dakota.—The mean temperature was 51.3°, or about 5.0° above normal; the highest was 92°, at Ashcroft and Cherry Creek on the 20th, and the lowest, 15°, at Cherry Creek on the 13th. The average precipitation was 2.73, or about 0.32 above normal; the greatest monthly amount, 4.81, occurred at Armour, and the least, 0.83, at Milbank.—*S. W. Glenn.*

Tennessee.—The mean temperature was 58.9°, or nearly normal; the highest was 90°, at Madison on the 7th and at Savannah on the 17th, and the lowest, 14°, at Erasmus on the 1st. The average precipitation was 4.48, or nearly normal; the greatest monthly amount, 10.62, occurred at Yukon, and the least, 1.14, at Elizabethton.—*H. C. Bate.*

Texas.—The mean temperature, determined by comparison of 41 stations distributed throughout the State, was 2.5° below normal. There was a general deficiency in all localities ranging from 1° to 6°, with the greatest in the vicinity of Camp Eagle Pass. The highest was 99°, at Fort Ringgold on the 25th, and the lowest, 22°, at Amarillo on the 10th. The average precipitation, determined by comparison of 50 stations distributed throughout the State, was 3.87 above the normal. There was a slight deficiency over the extreme western portion of the State and in the vicinity of Arthur City, Paris, and Sulphur Springs, while there was a marked excess elsewhere, ranging from 1.00 to 10.73, with the greatest in the vicinity of Colorado City. The rainfall was very heavy over central and southwest Texas. The greatest monthly amount, 12.36, occurred at Boerne, while none fell at Valentine.—*I. M. Cline.*

Utah.—The mean temperature was 45.7°, or 1.7° below normal; the highest was 88°, at St. George on the 19th, and the lowest, 10°, at Grover on the 9th. The average precipitation was 2.46, or 1.51 above normal; the greatest monthly amount, 4.83, occurred at Tropic, and the least, 0.49, at Soldier Summit. The precipitation was the heaviest that has occurred during April for many years.—*L. H. Murdoch.*

Virginia.—The mean temperature was 54.7°, or normal; the highest was 90°, at Fontella on the 30th, and the lowest, 12°, at Hot Springs on the 4th. The average precipitation was 2.88, or 0.11 above normal; the greatest monthly amount, 6.07, occurred at Scottsburg, and the least, 0.97, at Meadowdale.—*E. A. Evans.*

Washington.—The mean temperature was 50.8°, or about 3.0° above normal; the highest was 92°, at Ellensburg on the 30th, and the lowest, 20°, at Cle Ulum on the 9th. The average precipitation was 2.06, or about 1.25 below normal; the greatest monthly amount, 6.82, occurred at Clearwater, and the least, trace, at Loomis.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 51.8°, or nearly normal; the highest was 88°, at Point Pleasant on the 26th and at Huntington on the 29th, and the lowest, 16°, at Dayton on the 10th. The average precipitation was 1.35, or 1.60 below normal; the greatest monthly amount, 2.08, occurred at Wellsburg, and the least, 0.43, at Beckley.—*E. C. Voss.*

Wisconsin.—The mean temperature was 48.0°, or 3.1° above normal; the highest was 88°, at Antigo on the 28th, and the lowest, 11°, at Bayfield on the 3d. The average precipitation was 2.54, or 0.25 below

normal; the greatest monthly amount, 4.30, occurred at Koepenick, and the least, 0.83, at Racine.—*W. M. Wilson.*

Wyoming.—The mean temperature was 43.2°, or 1.7° above normal; the highest was 85°, at Douglas on the 20th and at Bittercreek on the 26th, and the lowest, 10° below zero, at Laramie on the 11th. The average precipitation was 4.46, or nearly three times the April normal; the greatest monthly amount, 9.50 (snow, 95.0), occurred at Sherman, and the least, 1.06, at Basin. The following excessive amounts were reported: Centennial, 8.63; Cheyenne, 7.66; Fort Laramie, 7.48; Embar, 7.36; Four Bear, 6.27; Lander, 7.19.—*W. S. Palmer.*

SPECIAL CONTRIBUTIONS.

SPECIAL REPORT ON THE FLOODS IN THE COLORADO VALLEY, TEXAS, APRIL 7 TO 17, 1900, AND OTHER FLOODS DURING THE SAME PERIOD.

By I. M. CLINE, Local Forecast Official and Section Director, dated May 15, 1900.

The Colorado is the second river in size and length in Texas. Its source is in northwest Texas near the southeast corner of New Mexico. It traverses the State from northwest to southeast, has a very tortuous channel, and empties into the Gulf of Mexico near the center of the Texas coast. The gradient of this river is quite steep north of latitude 30° 20′, the elevation at this latitude being 500 feet, while at the source of the river the altitude is nearly 3,000 feet. The channel of the Colorado River is very deep, ranging from 30 to 50 feet. There are, as with other Texas streams, first and second bottoms. The first bottoms through the northern and central portions of the drainage basin of the Colorado are narrow, frequently not more than 50 to 100 yards in width, and terminate abruptly in steep banks. These banks vary in height in different places from a few feet to several feet, and are styled the second banks; back of these are the second bottoms. In the lower Colorado Valley the first bottoms are more extensive and the distinction between these and the second bottoms is less marked. Stock raising is the principal industry throughout the more northern portion of the Colorado basin, while over the southern portion this industry is varied with extensive agricultural interests, even in the immediate vicinity of the river.

One of the most striking features of the Colorado River, in recent years, has been the dam across the stream at Austin. The length of this dam was 1,250 feet and its height 60 feet. The width of the reservoir was 1,000 feet, its depth 65 feet, and its length 30 miles. The dam was constructed of granite and cost in the neighborhood of $1,000,000.

The floods coincident with the bursting of the Austin dam April 7, 1900, resulted from unusually general heavy rains which fell throughout the drainage basin of the Colorado River on April 5, 6, and 7. The following stations report precipitation during these three days amounting to 5.00 inches or more: Austin, 7.10; Blanco, 6.60; Boerne, 6.30; Brownwood, 5.30; Colorado, 8.80; Duval, 5.20; Ira, 6.39; Langtry, 5.00; Luling, 5.15; New Braunfels, 5.38; San Marcos, 6.48; and Turnersville, 5.90. There are a number of stations which report between 3.00 and 5.00 inches during the same period. Nearly all rains which exceeded 4.00 inches during this period occurred at elevations ranging from 500 to more than 2,000 feet, and were over that portion of the State where the gradients are steep. The meteorological conditions which existed prior to and at the time of the occurrence of these heavy rains may be summed up as follows: An area of low pressure of moderate intensity covered the southeastern Rocky Mountain slope, April 3, 4, and 5. On April 3 an area of high pressure made its appearance over the upper Mississippi and Missouri valleys; during April 4 and 5 this anticyclonic disturbance increased in intensity and moved southward to the Ohio Valley and Tennessee, causing very steep barometric gradients to the northeast of Texas. On April 6 the high pressure remained stationary over the Ohio Valley and Tennessee, but the gradients were not so steep as on the previous date; the area of low barometer had moved southward and covered western Texas with a well-defined cyclonic movement of the atmosphere, although the barometer was not below 29.92 inches. On April 7 the barometer had fallen throughout the country and the disturbance which had remained nearly stationary over the southeastern Rocky Mountain slope and Texas for four days had moved southward into the Gulf of Mexico and was apparently central to the east of the mouth of the Rio Grande River.

While the conditions shown on the weather charts are such as generally give precipitation in Texas it is difficult to account for such heavy rains as occurred over a great portion of the State from April 5 to 7, inclusive. The topography of the territory covered by the rain area taken in conjunction with the wind direction, as shown by the weather charts on these dates, may be considered an important factor in producing these rains. It is observed that there was a conflict between the cool northerly and warm southerly winds over the eastern portion of the low pressure area which would have a tendency to form rapidly ascending air currents, a condition to which it appears that we must look for the cause of such phenomena.

The following table gives the rainfall in Texas during the flood period, from April 5 to 17, inclusive.

Station.	Rainfall.	Station.	Rainfall.	Station.	Rainfall.
	Ins.		*Ins.*		*Ins.*
Abilene	2.05	El Paso	T.	Longview	0.35
Alpine	0.03	Emory	0.64	Luling	5.15
Alvin	1.42	Estelle	2.90	Mann	4.23
Alice	1.00	Fort Clark	3.45	Menardville	2.00
Amarillo	3.11	Fort McIntosh	2.10	Mount Blanco	4.05
Anna	1.34	Fort Ringold	0.00	New Braunfels	5.38
Anson	2.10	Fort Stockton	1.18	Palestine	2.00
Arthur City	0.20	Fort Worth	3.50	Panter	3.96
Austin	7.10	Forestburg	1.56	Paris	0.00
Ballinger	1.12	Gainesville	2.50	Point Isabel	1.00
Beaumont	0.00	Galveston	1.13	Rhineland	1.68
Beeville	2.10	Georgetown	4.00	Rockisland	3.21
Bigspring	2.91	Grapevine	2.98	Runge	3.70
Blanco	6.60	Greenville	0.52	Sabine	2.30
Boerne	6.30	Hale Center	3.26	Saginaw	3.70
Bowie	2.19	Hallettsville	1.80	San Antonio	4.28
Brazoria	1.86	Haskell	1.63	San Marcos	6.48
Brenham	1.58	Henrietta	1.48	Santa G. Ranch	0.26
Brighton	1.44	Hewitt	3.40	Sherman	0.00
Brownwood	5.30	Hondo	4.75	Sugarland	1.50
Burnet	4.08	Houston	2.00	Sulphur Springs	0.38
Camp Eagle Pass	4.00	Hulen	1.04	Temple	2.67
Coleman	3.10	Huntsville	0.80	Texarkana	0.32
Colorado	8.80	Ira	6.39	Tulia	4.50
Columbia	0.70	Jacksonville	0.49	Turnersville	5.90
Corpus Christi	1.26	Jasper	0.70	Tyler	0.40
Corsicana	2.94	Kent	0.00	Victoria	1.48
Cuero	2.49	Kerrville	5.93	Waco	3.27
Dallas	2.30	Lampasas	4.58	Waxahachie	3.00
Danevang	1.48	Langtry	5.00	Weatherford	2.95
Dublin	4.38	Llano	4.65	Wichita Falls	0.06
Duval	5.20				

From a study of the rainfall by dates there appears to have been two rain areas. On April 5 heavy rains occurred over the southwestern portion of the panhandle. On the same date another area of heavy rainfall appeared along the Lower Rio Grande in the counties of Val Verde, Kinney, and Maverick, more than 300 miles south of the rain area in the panhandle. On April 6 the rain area from the panhandle moved toward the southeast, giving very heavy rains over the upper drainage basins of the Colorado and Brazos rivers. There was apparently a veritable cloudburst in Irion County judging from the local floods and the overflows which followed in the bottoms of the South Concho River. The rain area from

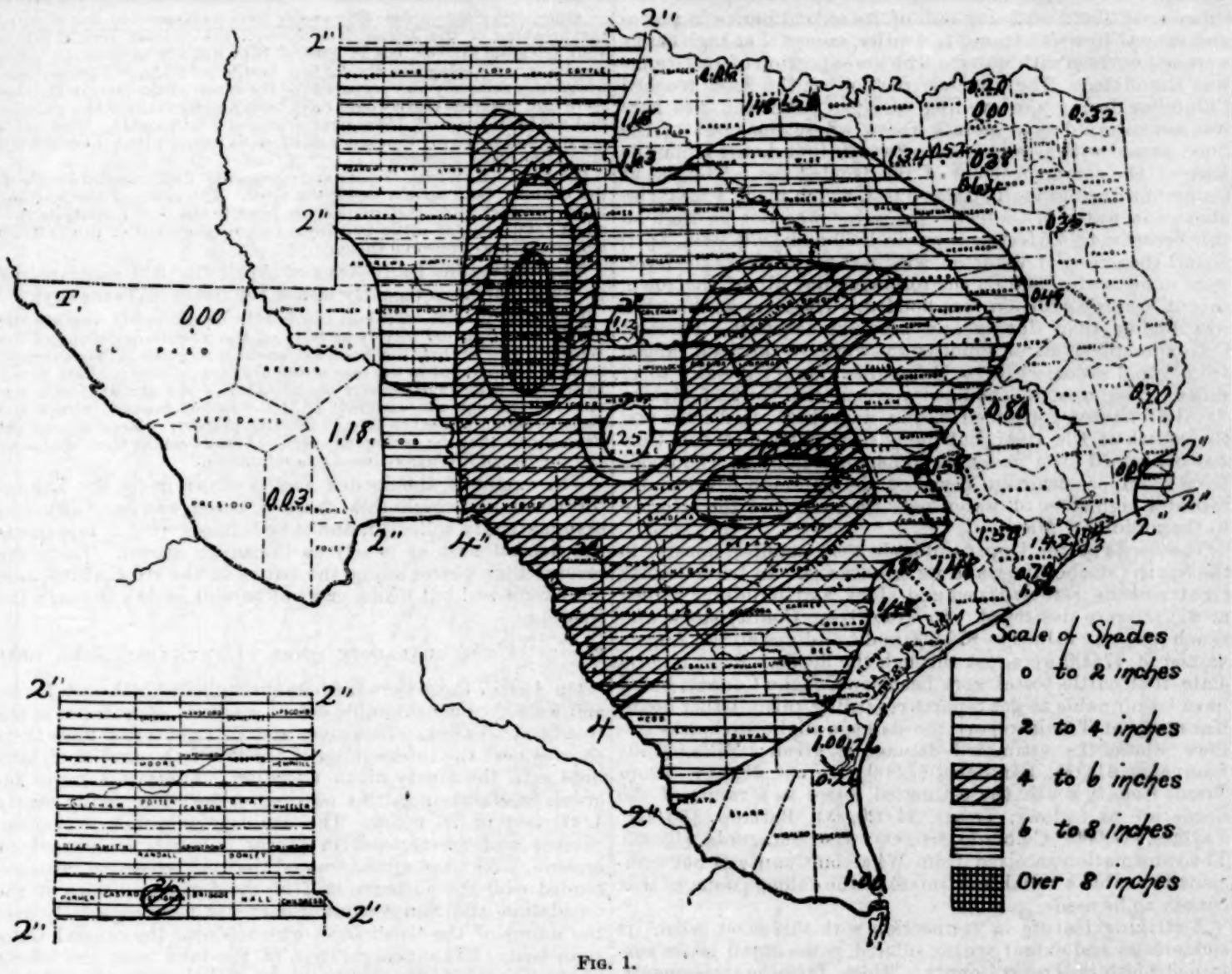


FIG. 1.

the Lower Rio Grande moved toward the northeast during April 6 and covered the central portion of the Colorado drainage basin. On April 7 the two rain areas appear to have united over the central part of the State; very heavy rains fell during the 24 hours ending at 8 a. m. of this date from the central part of the Texas coast northward to the Red River. The heaviest rains were, however, over the source of the Guadalupe River, the central Colorado basin and the northern portion of the central Brazos basin. There was no precipitation of consequence from April 8 to 14, inclusive.

The geographical distribution of rainfall in Texas during the flood period is shown in fig. 1, which has been drawn to represent the rainfall as given in the preceding table.

The heavy rains throughout the central and upper portions of the Colorado basin had filled the river almost to the top of its highest banks and was causing overflows in low places. The upper portion of the river was higher in some localities than in the memory of the oldest settler, and while carrying this flood the dam at Austin gave way under the pressure and added its volume of water to swell the already raging torrent. The news that the dam had broken reached the United States Weather Bureau Office, Galveston, about 6:30 p. m., April 7, by telegram from Mr. W. R. Neville, voluntary observer, Austin, as follows:

Six and half inches of rain last night. Dam broken.

Immediately on receipt of this telegram the following warning was telegraphed to all points along the Colorado River south of Austin:

Six and one-half inches of rain at Austin and dam broken. Sudden and decided rise in Colorado River is probable within next few days. Please distribute information.

The flood did great damage at Austin and in that vicinity. Besides the injury to the dam, the power house, and several other buildings were destroyed. Several lives were lost in Travis County. The flood caught 9 men in the power house at Austin, and 8 of these were drowned. Fifteen other persons were drowned in Travis County on the same date, April 7.

The crest of the flood reached Bastrop, April 8, where at 5 p. m. the river had risen 43 feet and was the highest since 1869. The town was completely surrounded by water and was cut off from communication with neighboring communities. The river was rising at an alarming rate in the vicinity of Smithville on the morning of April 8, and had already covered the bottoms; at 7:20 p. m. of that date, the crest of the flood reached Smithville, and the river stood 40 feet above low water, which is the highest point reached since 1869. The width of the overflow in Bastrop County ranged from 1 to 3 miles, except some high banks which were not submerged. The flood passed La Grange late in the evening of April 9, giving a rise of 47 feet above low water. All lowland was

submerged, the river being out of its second banks in places and ranged in width from 2 to 4 miles, except that high banks were not covered with water. The lower portion of La Grange was inundated. The advance portion of the flood reached Columbus during the evening of April 9, but the rise here was not so rapid as at points above, where the crest of the flood passed within eighteen to twenty-four hours from the time of the commencement of the decided rise. The rise at Columbus during April 10 was 5 feet, which made a total rise above low water of 34 feet. The river was not as high on this occasion by 4.5 feet as it was in 1869 and 1870. On April 13, all the streets of Wharton, within three blocks of the river, were under water, and on the following day all of the town, except Victor's addition, was flooded. The river at Wharton was higher than during any previous overflow. Through Colorado and Wharton counties the width of the flood ranged from 2 to 4 miles, while in Matagorda County it was 4 to 12 miles. The crest of the flood reached the Gulf of Mexico April 17, having consumed eleven days between Austin and the mouth of the river, but the greater portion of this time was consumed after reaching Wharton County. The floods from the upper drainage basin of the Colorado River maintained a high stage of water near the mouth of the river up to the middle of May.

The floods of the Upper Colorado were confined mostly to the South Concho River and its tributaries. In Irion County eight persons were drowned and stock and buildings valued at $7,500 were destroyed. In Tom Green County stock and ranch property valued at $75,000 and buildings at San Angelo valued at $7,000 were lost through the floods. Press reports state that cattle losses were heavy in Concho County, but I have been unable to get reports regarding this. Other counties north of Travis report the damage slight, except as follows, where the estimated damage is given: Mills, $250; Lampasas, $1,000; San Saba, $1,500; Burnet, $5,000. From Travis County south the estimated losses as a result of the floods are as follows: Travis, $1,020,000; Bastrop, $50,000; Fayette, $14,000; Colorado, $80,000; and Matagorda, $10,000. The information received from Wharton County is not sufficient to enable a reliable estimate of the damage done in that county to be made.

A striking feature in connection with this flood, when its suddenness and extent are considered, is the small losses sustained south of Travis County. Stock, farming implements, and personal effects had been moved to high ground as a result of the warning referred to above. The value of the warning can not be estimated, but reports show that it saved to the people of the Colorado Valley thousands of dollars. At Smithville stock were moved out of the bottoms on the night of April 7, after the receipt of the warning; by the following morning the flood had reached such proportions in that section that it would have been impossible to have saved them. Lower down in the valley people had more time for preparation, and press reports sent out from the several localities show that the warning was heeded and that no time was lost in getting property into places of safety. Another feature of importance is that no lives were lost south of Travis County.

The following reports from some of the towns along the Colorado River convey some idea as to the value of the warning:

Smithville.—E. G. Winston: The flood warning was received and the information promptly distributed. The warning was of great benefit to farmers and stockmen, as all cattle were run out of the bottoms, where they would have been cut off by the water and drowned. One stockman saved 250 head of young cattle; the pasture they were in was flooded the next morning (April 8). The river covered all low lands. But few houses were destroyed here, for after receipt of the warning many houses were tied to their places with ropes and saved. The chances are that many lives and a large amount of property would have been lost without the news of the breaking of the dam.

Altair.—Paul Schneider: The people here had received the news of the breaking of the Austin dam through the railroad people before your telegram arrived, but in general they did not believe it. After receiving your telegram, we did our best to let all know; people took the matter seriously and prepared for the same; consequently no lives were lost, whereas there would have been a great many if the warning had not been received. The river averaged 3 miles wide. The warning resulted in saving thousands of stock, as people drove them to high land after being warned.

Columbus.—L. Weete: Your warning was well distributed throughout the country, both up and down the river. The value of the warning in saving stock and other property is hard to tell, but I estimate that about 3,000 head of cattle and horses were taken out of the bottoms before the water reached them.

The Galveston Daily News of April 29, 1900, commenting on flood warnings recently issued for rivers in Texas says:

The value of such warnings can hardly be estimated, because the people have learned to rely so fully on the weather warnings of the Weather Bureau that they heed any warning received. This was most forcibly brought out in the case of the overflow of the Colorado River. In sections where the news of the breaking of the dam at Austin was received through the warnings of the Weather Bureau prompt and decisive action was taken to save life and property. Reports sent out have shown that the savings as a result of that warning were enormous and the loss of life was reduced to a minimum.

The extent of the flooded area is shown in fig. 2. The information on which this chart is based was carefully and systematically collected, and it is believed that it represents the flooded area as nearly as it can be shown. There are several high places along the banks of the river which were not overflowed but which can not be well shown through the shading.

FLOODS IN THE GUADALUPE RIVER VALLEY, APRIL 7–12, 1900.

On April 7 there were freshets throughout southwest Texas, and a flood of considerable extent made its appearance in the Guadalupe Valley. This river and its tributaries have their sources near the intersection of the thirtieth parallel of latitude with the ninety-ninth meridian. There is a rapid increase in elevation in this portion of the State, being nearly 1,000 feet in 75 miles. The country is broken with deep ravines and creeks, and in places is much sculptured by erosion. We have already noted that the excessive rains extended over the northern half of the drainage basins of the Guadalupe and San Antonio rivers, but more especially over the source of the Guadelupe, which is near the central Colorado basin. The configuration of the land near the source of the Guadalupe is such that nearly all the water from heavy rains is quickly carried into the ravines and creeks and by these into the rivers. These streams rise with phenomenal rapidity, but, their channels being very deep, it is only when excessive rains are general that overflows result. Many of the small streams will carry a rise of 50 to 60 feet without overflowing their banks. When a number of the small streams are thus filled, their simultaneous discharge, as it were, into the rivers cause very sudden overflows. This was the case with the flood in the Guadalupe River April 7 to 12, 1900. The waters came principally from Comal, Guadalupe, Caldwell, Hays, and Gonzales counties. A 30-foot rise occurred in the San Marcos River, and this met with a greater rise in the Guadalupe at their junction in Gonzales County. The flood reached Gonzales County during the night of April 7, with a phenomenally sudden rise, resembling the rush of water from a burst dam. The flood passed out of De Witt County on April 10, and reached Victoria during the night of April 11, where it approached close to the highest water ever recorded.

The counties suffering greatest damage from the Guadalupe flood are: Hays, Caldwell, Guadalupe, and Gonzales. Two persons were drowned in Gonzales County. South of De Witt County much of the bottoms is used for grazing purposes, and the damage to agricultural interests was not very great. A large number of stock were drowned by this flood.

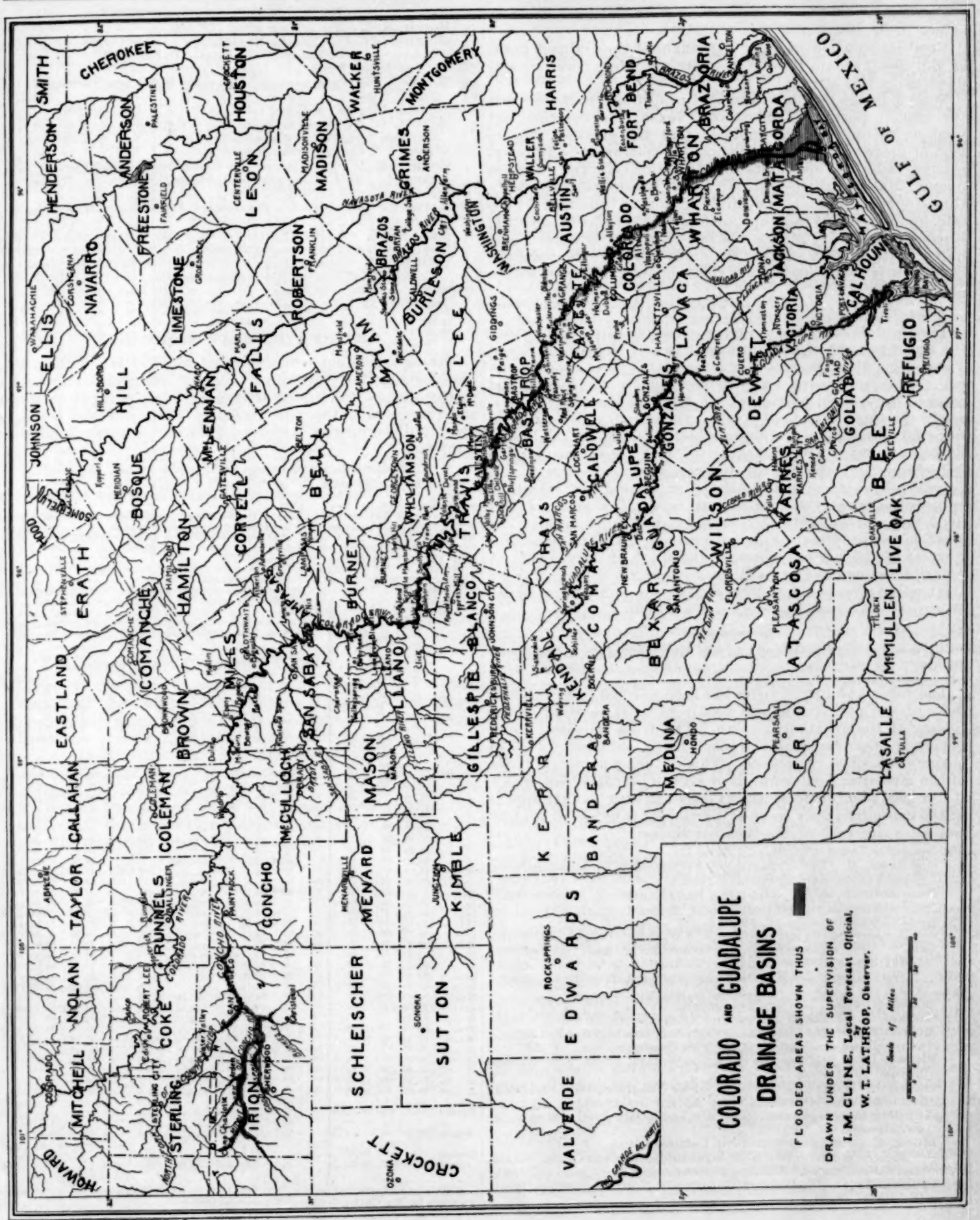

COLORADO AND GUADALUPE
DRAINAGE BASINS
FLOODED AREAS SHOWN THUS
DRAWN UNDER THE SUPERVISION OF
I. M. CLINE, Local Forecast Official,
by
W. T. LATHROP, Observer.
Scale of Miles
GULF OF MEXICO
SMITH
CHEROKEE
HENDERSON
ANDERSON
FREESTONE
LIMESTONE
ELLIS
NAVARRO
JOHNSON
HILL
BOSQUE
HAMILTON
CORYELL
MCLENNAN
FALLS
BELL
ROBERTSON
MILAM
WILLIAMSON
TRAVIS
HOUSTON
LEON
MADISON
WALKER
MONTGOMERY
GRIMES
BRAZOS
BURLESON
WASHINGTON
LEE
BASTROP
HARRIS
WALLER
AUSTIN
FAYETTE
COLORADO
FORT BEND
WHARTON
BRAZORIA
MATAGORDA
JACKSON
CALHOUN
VICTORIA
LAVACA
DEWITT
GONZALES
GUADALUPE
CALDWELL
HAYS
WILSON
KARNES
GOLIAD
BEE
REFUGIO
LIVE OAK
EASTLAND
CALLAHAN
TAYLOR
NOLAN
MITCHELL
HOWARD
COLEMAN
BROWN
COMANCHE
RUNNELS
COKE
STERLING
IRION
CONCHO
MCCULLOCH
SAN SABA
MILLS
BURNET
LLANO
MASON
MENARD
SCHLEICHER
SUTTON
CROCKETT
KIMBLE
GILLESPIE
BLANCO
KERR
EDWARDS
VALVERDE
KENDALL
BANDERA
BEXAR
MEDINA
ATASCOSA
FRIO
LASALLE
MCMULLEN

FIG. 2.

The extent of the overflow along the Guadalupe River is shown in fig. 2.

Freshets occurred on April 7 throughout the drainage basin of the San Antonio River, but there was no extensive overflows along this stream.

Much damage resulted to agricultural interests throughout the greater portion of southwest Texas from beating and washing rains. Reports indicate that the greatest proportion of crops planted (mostly cotton) destroyed both by excessive rains and overflows was as follows in the counties named: Bastrop, three-fourths; Bexar, one-fourth; Caldwell, three-fourths; Comal, one-third; Colorado, one-half; Fayette, one-fourth; Guadalupe, one-half; Gonzales, one-third; Karnes, one-fourth; Matagorda, one-fourth; and Wilson, one-half. With average weather the crops can be replanted sufficiently early to mature a good yield should a favorable season prevail.

FLOODS IN THE BRAZOS VALLEY.

The rainfall chart, fig. 1, shows excessive rains throughout the upper portion of the drainage basin of the Brazos River. These rains filled the upper portion of the river nearly bank full. This volume of water moved slowly southward and reached the central portion of the drainage basin of the Brazos in the third decade of April. During this time general rains fell throughout the State, which maintained the Brazos River at a high stage. On April 27 and 28 excessive rains fell throughout the Brazos drainage basin, which, with the volume of water already in the river, caused a flood which approached closely to that of last July. The crest of this flood has not yet (May 15) passed out at the mouth of the river, but is in Brazoria County, where the water is within 1.8 feet of the highest water of the flood of July, 1899. A report covering the Brazos River flood of April 28 to May 15, 1900, will be prepared and forwarded for publication in the MONTHLY WEATHER REVIEW for May, 1900.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined list of titles has been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Meteorologische Zeitschrift. Wien. Band 17.

Bjerknes, V. Das dynamische Princip der Cirkulationsbewegungen in der Atmosphäre. P. 145.

Danckelman, A. v. Klima von Neu-Guinea. P. 157.

—— Vereinsnachrichten. P. 165.

—— Dr. Joseph Krist. P. 167.

—— Ausserordentlicher Schneefall in Wien und Umgebung P. 169.

Erk, —. Die wissenschaftlichen Ballonfahrten am 3 Oktober 1899. P. 171.

—— Wirksamkeit des Hagelschiessens auf unterkühlte Tröpfchen. P. 173.

Ecker, Stefan. Haloerscheinungen. P. 174.

Gockel, A. Luftelektricität und Temperatur. P. 175.

Moller, A. Ueber Umbildung von Cumuluswolken. P. 176.

Suring, R. Verschiedene Arten von Haufenwolken. P. 177.

Flogel, Dr. Bildung von Cumulus-Wolken durch eine Feuersbrunst. P. 179.

Hann, J. Haufenwolken über einer Feuersbrunst Leuchtende Nachtwolken. P. 182.

Koppen, W. Hauptsätze über die Temperaturvertheilung in der Erdatmosphäre. P. 182.

Mack, K. Eine ungewöhnliche Luftspiegelung. P. 187.

—— Meteorologische Beobachtungen im Innern von China. P. 189.

Petermann's Mitteilungen. Gotha. 46 *Band.*

Pettersson, O. Die Wasserzirkulation im Nordatlantischen Ozean. (Schluss). P. 81.

Nature. London. Vol. 61.

Rotch, A. L. The eclipse wind. P. 589.

Clayton, H. H. Recent Exploration in the Upper Air and its bearing on the Theory of Cyclones. P. 611.

Himmel und Erde. Berlin. 12 *Jahrg.*

Hapke. Die Warmwasserteiche an der Westküste Norwegens. P. 316.

Geographical Journal. London. Vol. 15.

Schott, G. Oceanographical and Meteorological Work of the German "Valdivia" Expedition. P. 518.

Ciel et Terre. Bruxelles. 21*me Année.*

Zeuger, C. V. La Météorologie électrodynamique et son application à la prévision des grandes perturbations atmosphèrique. P. 109.

Sitzungsberichte der kaiserlichen Preussischen Akademie der Wissenschaften. Berlin. 1900.

Bezold, W. v. Zur Thermodynamik der Atmosphäre P. 356.

Archives des Sciences Physiques et Naturelles. Genève. 4 *Période. Tome* 9.

Gautier, R. Observations météorologiques faites aux fortifications de Saint Maurice pendant l'année 1898. (Suite et fin). P. 334.

Das Wetter. Berlin. 17 *Jahrg.*

Assman, R. Die Sonnenstrahlung. P. 81.

OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made partly in accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

Meteorological observations at Honolulu, March, 1900.

The station is at 21° 18′ N., 157° 50′ W.

Pressure is corrected for temperature and reduced to sea level, and the gravity correction, −0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours has always been measured at 10:29 p. m., not 1 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	During twenty-four hours preceding 1 p. m., Greenwich time, or 2:29 a. m., Honolulu time.											Total rainfall at 9 a. m., local time.
		Temperature.		Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	29.98	70	59.5	78	66	58.5	63	ne.	4	4	30.04	29.94	0.02
2	29.96	70	62	77	68	55.0	60	nne.	4-2	4	30.02	29.94	0.02
3	29.94	71	63.5	78	66	58.7	62	ne.	4	5	30.01	29.90	0.00
4	29.99	66	64	80	70	61.7	71	ne.	3	7	30.05	29.95	0.08
5	29.98	63	62	81	64	63.5	78	ne.	3	3	30.04	29.94	0.25
6	29.88	66	63	79	62	63.5	78	w.	1	3-8	30.00	29.87	0.00
7	29.89	67	65	79	65	64.7	75	sw.	1	4-10	29.98	29.84	0.00
8	29.89	68	66	79	67	66.5	81	sw.	3	9	29.93	29.85	0.15
9	29.90	60	57.5	80	66	66.3	80	sw-w.	3	∣	29.94	29.83	0.01
10	29.95	59	57	78	60	56.3	66	w.	3-0	2-4	29.98	29.86	0.00
11	29.90	63	59.5	76	59	57.8	72	sw-s.	2	2-5	29.99	29.90	0.00
12	29.80	72	57	78	60	59.3	67	w-sw.	3	4	29.94	29.82	0.06
13	29.85	59	55.5	79	66	60.7	66	w.	4	8-0	29.87	29.73	0.00
14	29.90	61	59	78	59	55.3	65	sw.	3-1	1-5-1	29.96	29.84	0.00
15	29.96	61	58	78	60	58.7	71	sw.	2-0	3	30.03	29.90	0.00
16	29.93	68	65	80	60	59.7	70	sw.	1-0	¶	30.06	29.93	0.00
17	29.90	66	63.5	81	66	63.3	72	sw.	2	3-6	30.01	29.93	0.02
18	30.00	68	65.5	79	65	62.0	68	n-ne.	0-3	3	30.05	29.98	0.60
19	30.02	71	65	78	66	64.0	77	ne.	0-3	10-5	30.06	29.97	0.01
20	30.00	73	65	80	66	62.3	65	ne.	3	3-7	30.07	29.97	0.05
21	30 04	72	65.5	78	70	61.5	63	ne.	3-5	5	30.08	29.98	0.24
22	30.03	72	65	78	68	62.5	66	ne.	5	4	30.09	30.00	0.07
23	30.04	73	66.5	80	70	62.7	67	ene.	5	5	30.09	30.00	0.02
24	30.02	73	65	79	72	62.3	67	ene.	4	4	30.11	30.01	0.01
25	30.03	73	66	79	72	60.5	61	ne.	4	5	30.12	30.03	0.05
26	29.98	68	64	79	72	61.3	64	ne.	4	4	30.06	29.97	0.01
27	29.98	71	63.5	81	68	61.0	64	ne.	2-4	1	30.01	29.90	0.00
28	29.95	71	64.5	81	71	60.0	61	nne.	3	2	30.00	29.90	0.00
29	29.96	65	63	82	70	62.0	68	ne.	3-0	4	30.02	29.90	0.00
30	29.97	69	62.5	80	64	63.3	77	s.	1	4	30.04	29.94	0.00
31	29.97	62	58.5	79	63	57.7	61	nne.	3	1	30.04	29.95	0.00
Sums..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.67
Means.	29.955	67.5	64.5	79.1	65.7	61.0	68.6	.....	2.2	4.3	30.02	29.92	....
Departure..	.....	.....	.....	.....	.....	−0.5	−4.0	.....	.....	−0.3	.....	.....	−1.60

Mean temperature for March, 1900 (6+2+9)+3=71.8°; normal is 70.6°. Mean pressure for March (9+3)+2 is 29.97; normal is 29.99.

Meteorological observations at Honolulu, April, 1900.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 2:30 a. m., Honolulu time.									Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	30.00	70	62.5	80	62	57.7	65	nne.	3-0	2	30.05	29.95	0.00
2	30.01	72	67.5	79	65	61.7	67	ene.	3-0	2	30.07	29.97	0.00
3	30.05	69	66.5	82	67	65.5	71	e.	3-0	3-8	30.11	30.02	0.00
4	30.04	68	65.5	82	69	66.5	75	sw.	2	3-10	30.12	30.03	0.00
5	30.05	72	66.5	85	68	65.3	72	sw-e.	2	3	30.11	30.02	0.00
6	30.07	73	67	83	67	63.5	65	e-ne.	3	3	30.12	30.03	0.10
7	30.05	73	66.5	81	69	64.0	70	ene-nne.	3-5	8-3	30.15	30.01	0.00
8	29.99	70	65	82	72	63.5	63	ne.	3	3	30.09	29.99	0.01
9	29.96	68	66	82	70	61.5	64	ne.	3-5	1	30.00	29.90	0.13
10	29.95	67	66	78	66	63.3	73	ne.	4	8-2-8	30.00	29.90	0.42
11	29.99	70	66.5	75	66	66.5	87	ene.	4	9	30.05	29.95	0.60
12	30.00	73	67	79	69	65.5	75	ne.	4-5	6	30.06	29.97	0.11
13	29.99	73	67	80	70	65.0	71	ne.	3	5	30.05	29.96	0.16
14	29.96	68	65	81	73	63.7	65	ene.	4	3	30.03	29.95	0.00
15	29.96	70	66.5	83	68	63.3	67	nne.	2	1	30.02	29.92	0.05
16	30.01	68	64.5	81	69	64.0	67	ne.	2	3-6	30.05	29.97	1.33
17	30.00	68	59.5	74	66	59.0	69	nne.	4-6	7	30.04	29.98	0.00
18	29.97	64	62	73	67	55.3	60	nne.	4	9	30.06	29.94	0.25
19	29.95	66	62	74	62	58.0	68	nne.	4	7	30.01	29.94	0.29
20	29.96	71	64	75	63	61.7	76	ne.	3	8	30.00	29.93	0.06
21	29.95	70	65	78	68	62.0	69	nne.	4	7	30.02	29.93	0.09
22	29.96	71	66.5	79	67	63.5	72	ne.	3	6-3	30.02	29.93	0.01
23	29.96	71	66.5	79	70	65.0	73	ne.	3	9-4	30.02	29.95	0.18
24	29.97	69	67	80	69	66.0	76	ne.	3	7	30.08	29.97	0.31
25	29.97	66	65.5	79	68	65.7	78	ne.	2	8-10	30.04	29.95	0.82
26	29.94	66	64.5	80	66	66.5	84	sw-w-ne	1-0	4-8-0	30.01	29.92	0.29
27	29.92	68	66	81	64	66.0	81	sw-w-ne	0-2	1-6-0	29.99	29.91	0.01
28	29.90	65	64	81	65	66.5	80	sw-w-ne	0-2	0-7-0	29.96	29.87	0.00
29	29.95	63	61	79	64	64.3	78	n-s-w.	0-2	8-0	29.98	29.89	0.00
30	29.98	64	60	78	61	59.5	69	sw-ne.	1	6-0	30.02	29.94	0.00
Sums..	.....	.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	5.23
Means.	29.982	68.9	65.0	79.4	67.0	63.3	71.7	.....	2.7	4.8	30.044	29.943	.....
Departure..	—0.20	.....	.....	.....	.....	0.0	0.0	.....	.....	—0.3	.....	.....	+2.24

Mean temperature for April, 1900 (6+2+9)+3=72.8; normal is 72.8. Mean pressure for April (9+3)+2 is 29.898; normal is 30.018.
*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 7:29 p. m., Greenwich time. ‡These values are the means of (6+9+2+9)+4. §Beaufort scale. ‖3-10-0. ¶1-0-10.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana, Director of the Central Meteorologic-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletin Mensual. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for April, 1900.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inch.*	°*F.*	°*F.*	°*F.*	%	*Inch.*		
Arteaga (Coahuila)	.....	.....	87.8	50.0	70.7	.....	.....	.....	... .
Culiacán Rosales (Sinaloa)	112	29.72	90.5	62.6	75.4	47	.....	w.	.....
Durango (Seminario)	6,243	23.98	84.2	42.8	60.6	35	....	sw.	w.
Gral Zepeda (Coahuila)	.....	.....	100.4	41.0	71.8	.....	.....	.....	.....
Guanajuato	6,640	23.66	88.5	48.2	67.6	38	0.14	wsw.	sw.
Leon (Guanajuato)	5,934	24.24	89.2	44.2	67.3	37	T.	w.	w.
Mazatlan	25	29.91	81.0	61.3	72.7	71	.....	nw.	sw., w.
Merida	50	29.89	101.3	59.0	84.4	63	2.36	se.	se.
Mexico (Obs. Cent.)	7,472	23.01	86.0	46.4	64.8	42	0.79	sw.	sw.
Morelia (Seminario)	6,401	23.94	84.0	45.3	64.0	44	0.24	s.	w.
Parras (Coahuila)	3,986	.....	88.7	49.1	73.0	.....	.....	.....	.....
Puebla (Col. Cat.)	7,112	23.35	84.2	48.6	67.8	48	0.02	ese., ssw.	sw.
Puebla (Col. d. Est.)	7,118	23.30	84.9	47.8	66.6	45	0.20	nne.	w.
Saltillo (Col. S. Juan)	5,399	24.06	84.7	38.8	65.1	55	T.	s.	sw.
San Isidro (Hac. de Guanajuato)	.....	.....	78.4	59.9	.....	.....	0.20	w.	.....
Silao	6,063	24.22	84.9	54.9	68.9	44	0.03	wsw.	w.
Tuxtla (Gutierrez Chiapas)	1,864	28.13	100.4	55.4	77.2	63	.....	nnw.	sse.

THE DROUGHT OF 1899 IN SOUTHWEST MISSOURI.

By Mr. J. S. HAZEN, Observer, Springfield, Mo.

The three months of dry weather, accompanied by long continued high temperature at Springfield, Mo., during the summer of 1899, proved a serious matter to nearly all classes of business, and a fruitful topic of discussion, in a climatological sense.

The fact of the drought being to some extent local, did not lessen the annoyance nor abate the suffering and loss to this community. The ground became dry to a depth of 4 feet, while for weeks at a time the country roads were almost impassible because of the dust. The corn crop was practically a failure; late fruits and garden truck nearly so, while the damage to lawns, meadows, pastures, and forest and fruit trees was severe. Numbers of trees died, many more shed their leaves prematurely with the probability that they may never recover their full vitality.

The accompanying numerical tables giving departures from normal conditions, for the years 1897 and 1899, show a remarkable similarity in many respects. Much of the rain which fell earlier in the season, in both years, occurred in heavy showers, and as a consequence a large amount of what might, with light or ordinary rains, have been surplus moisture, was lost to the soil before it could be absorbed. Many people claimed that the soil actually contained less moisture, and that the effect of the drought on vegetation was more noticeable in 1897 than was the case during the summer of 1899. Whether such a statement is true or not, I can not say, but the records of this office show that more rain fell during July and August, 1897, than during the same period for 1899. From August 14 to September 16, 1899, the rainfall was only 0.38 inch and only about three-fourths of an inch fell from July 30 to September 16, inclusive. When the fact is taken into consideration that no rainfall between June 15 and September 17, wet the soil more than 2 inches below the surface, we can more nearly appreciate the severity of the drought. In addition to the light rainfall the past summer was characterized by an excess of temperature, an abnormal amount of sunshine, and a high average wind velocity.

During the last ten days of August and the first ten days of September, 1899, the daily average excess in temperature was nearly 10°, while the total excess in daily temperatures from March 1 to October 10 was over 700°. There were but two days during August on which the temperature fell below normal.

During August and September, 1897, there was a longer period of continuous dry weather than was recorded during 1899. From August 21 to September 16, 1897, only 0.10 of an inch of rain fell, and during the entire month of September only 0.37 inch fell. The drought also extended well through October.

During July, August, and September, 1899, comparatively few upper clouds were observed, and from the middle of August until the middle of September, practically none were seen. During the summer of 1898, which was a year of abnormally heavy rainfall, upper clouds predominated, and but comparatively few distinctive cumulus clouds were recorded. During July, August, and September, 1899, an unusually large amount of the distinctive cumulus or fair weather type of clouds was observed. Cumulus clouds varying from a few to four-tenths were observed on twenty-one days during August. During the second week in September there was a period of six days on which no clouds were observed, and, as compared with the previous week, the temperature had fallen about 10°.

During the latter part of August and the first of September the change in the character of the clouds was gradual, but well marked. The cumulus type gradually took on a strato-

cumulus or stratus formation, and after September 17, when the drought was partially relieved by a fair rain, no distinctive types of the cumulus clouds were observed. September 17 was apparently the turning point or transition period between summer and fall conditions, and although the drought continued through October, the clouds observed were of a radically different type. Strato-cumulus and stratus types prevailed, with an apparently increasing amount of upper clouds.

The inclosed photographs[1] will give a fair idea of the cumulus types referred to. The clouds shown in the photographs are apparently typical cumulus or "fair weather clouds," and proved to be especially characteristic of dry summer weather conditions in this locality during 1899. Two cloud pictures were taken later and exhibit more of the stratus type. They were at a less elevation than the cumulus types and were moving in a different direction from the upper cumulus clouds. They also, as will be seen from the photographs, appear darker with a more broken outline and had apparently settled down from the cumulus clouds. The characteristic differences can be detected more readily from the photographs than from any description.

These types of clouds were particularly indicative of fair settled weather during the summer of 1899. No rain occurred within three days following such types of clouds, and in one example given (photograph B) no rain occurred within the following week.

During the summer of 1898 very few distinct types of the cumulus clouds were observed and the records show the heaviest rainfall ever observed at this station. A series of photographs or cloud observations during wet and dry seasons will doubtless give valuable results. It will be necessary, however, to differentiate closely between cumulus and cumulonimbus types.

Many interesting queries are suggested by a study and comparison of the accompanying tabular data. Table 1 shows a small gradual increase in the amount of southeast wind from July to October for the years 1897 and 1899, and also indicates a decided increase in the rain deficiency, directly opposed to the theory that the direction of the wind has a modifying effect upon the rainfall. In Table 2 we compare the average number of times rain followed winds from the north, northeast, east, etc., for a period of ten years, with the actual number of such rainy days during 1897 and 1899. The total number of winds from the different directions is also shown. The data given under annual average temperature departures for each wind (Table 2) agree substantially with the normal law of distribution of temperature with wind, and we find that a year with deficient rainfall gives an excess of temperature. The theorem that deficient rainfall gives an excess of temperature for this locality during the summer months, is strengthened by the long continuance of high temperature and southeast winds during 1897 and 1899. It will be observed that the average number of rainy days following winds from the southeast and northwest is larger than from other directions, and also that the southeast wind was followed by more rainy days during the years 1897 and 1899 than on the average, notwithstanding the deficiency in rainfall during those years.

A comparison of the different tables shows so many exceptions to preconceived ideas that any attempt to reconcile the discordant elements only emphasizes the old adage that "all signs fail in dry weather." When terrestrial signs fail what then remains? In the opinion of the writer the solution, not only of this problem but of many more pertinent questions in meteorology, must be sought for higher up. The great bulk of the upper air still remains an unexplored territory, and it is to this region we must turn.

[1] The Editor regrets that these photographs do not admit of reproduction as half-tones.

TABLE 1.

Months.	Number of observations of southeast wind.					The rainfall.				
	Normal.	1897.	Departure.	1899.	Departure.	Normal.	1897.	1899.	Average, 1897-99.	Departure.
May	14	21	+ 7	17	+ 3	6.18	2.48	6.72	4.60	− 1.58
June	15	20	+ 5	20	+ 5	4.58	5.36	5.24	5.30	+ 0.72
July	15	10	− 5	10	− 5	4.63	2.48	1.48	1.98	− 2.65
August	16	10	− 6	20	+ 4	4.01	1.48	0.75	1.12	− 2.89
September	16	27	+11	15	− 1	3.96	0.37	1.06	0.72	− 3.24
October	17	30	+13	19	+ 2	2.41	0.93	5.41	3.20	+ 0.79

TABLE 2.

Direction.	Annual wind frequency.				Annual average temperature departure for each wind.	
	In general.	Followed by rain.				
		Normal.	1897.	1899.	Normal.	1897-99.
					°	°
North	82	20	21	21	− 36	− 44
Northeast	67	18	8	18	− 19	− 30
East	61	15	8	8	+ 8	+ 8
Southeast	192	28	32	30	+ 46	+ 50
South	133	22	17	22	+ 42	+ 48
Southwest	64	12	8	3	+ 19	+ 29
West	43	8	8	11	− 2	− 5
Northwest	90	17	21	21	− 45	− 45
					+115	−124
					−102	+135

THE CLIMATOLOGY OF HAVANA, CUBA.[1]

By Dr. ENRIQUE DEL MONTE, dated January, 1898.

I.—LOCATION AND APPARATUS.

1. The Meteorological Observatory of Havana was erected in 1886 in the Vedado Park, lying in a western and most fashionable quarter of the city. The building had all the requisites necessary for the work for which it was destined—it was well isolated, the main floor was 30 feet above sea level, and about 350 yards from the sea shore—so that the circulation of the air was perfect, and free from the radiations so commonly affecting this kind of work in large cities. The installation of the thermometers and psychrometers was the object of great attention and study, and was accomplished in the following manner: On the flat roof or platform of the building a small room was erected (8 feet across) of an octagonal shape, surrounded with venetian blinds, at an angle of 45 degrees, and roofed with a mixture of plaster of paris, so as to render it more obstructive to the heat than the ordinary roof painted with white lead. In this way the temperatures taken are, we believe, correct.

2. To our great surprise we have often seen in encyclo-

[1] Many years ago a school of agriculture was founded at Havana under the special patronage of the Count of Casa Moré, President of the Society of Planters. Its courses of instruction were under the direction of able professors, and there were attached to it experimental conveniences, a meteorological observatory, and other evidences of scientific work. The events of the past few years have apparently checked the good work begun at that time, but the need of such an institution as the modern college of agriculture and agricultural experiment stations is greater than ever, and we are pleased to learn that Señor Biscay and Don Manuel Calvo have offered to cooperate with the Cuban government in the establishment of a new school of agriculture.

The meteorological observatory of this college was suggested by Count Moré in July, 1886; the idea was realized through the enthusiastic assistance of shipowners and planters; among them the Count of Morteva and Messrs. Arrieta, Ibañez, Mesa, Alfonso, M. Artiz, and numerous merchants were prominent donors. Dr. Enrique del Monte, a professor in the Havana University, was chosen director of the new observatory, which was inaugurated on January 1, 1887, under the auspices of the agricultural college. The director promptly began to establish substations throughout the island, but apparently accomplished this only in part, in the eastern and western ends of Cuba. Early in

pedic almanacs, printed in foreign cities, temperatures assigned to Havana (both extremes and means) that are always too high. We do not know the source from which this information has been taken, but we suppose it has been from the summaries published by some private observatories. As a general rule, we have seen the thermometers defectively installed, the system being the old one, long ago rejected, of a very small shelter, perhaps no more than 2½ feet square, attached to a northern wall of the building. Such an installation is always objectionable, but still more so in tropical countries, where the sun reaches a great altitude at the summer solstice. In these cases the sun's rays strike the shelter in the hottest hours of the day, and it frequently happens that as southerly winds are blowing then, the thermometers are out of the circulation of the air, and at the same time subjected to the enormous radiation of the shelter itself; the maximum temperatures are, therefore, erroneous. Regarding the minimum temperatures in Havana, such an installation is still more objectionable, inasmuch as the prevailing directions of the wind from 7 p. m. to 9 a. m., are from southeast to southwest. As a good illustration of this particular, we will only refer to two cases, occurring in the first year of the establishment of our observatory—1887. In the meteorological summary for that year, published by the Observatory of the Royal Belén College, Havana, we find that the maximum temperature of the year occurred on the 28th of August, at 2 p. m., and it was 96.6°. According to our summary, that really was the hottest day in the year, but the maximum thermometer in our observatory only reached 90.5°. The same summary for Belén shows that the wind's direction, from 6 a. m. to 4 p. m. on that day, was south-southwest. In connection with the minimum temperature, we find that according to the Belén summary, for 1887, the coldest day in that year was January 5, the thermometer reaching 49.6° at 4 a. m. That was, certainly, the coldest day in the year, but we got as a minimum 45.1° at Vedado Park. South-southwest winds were then blowing all over the city.

3. To return now to the installation of the instruments, we will next refer to that of the anemometers, wind vane, rain gage, atmidometer, and sunshine recorder.

4. The two anemometers and the wind vane were erected on the flat roof, upon supports 11, 14, and 15 feet high, respectively. The rain gage, atmidometer, and sunshine recorder were adequately installed in the same place.

5. Below is the list of the principal instruments we had in use within the observatory:

Two mercurial barometers, Fortin's system, of 0.8 and 0.6 inches internal bore, respectively; provided with English and French scales, the verniers reading 0.002 of an inch, and 0.05 millimeters. These barometers were of the manufacture of Negretti and Zambra, of London, and were accompanied with certificates of verification made at the Kew Observatory.

A self-recording aneroid barometer of the manufacture of Richard Frères, of Paris.

Two maximum thermometers, made by H. J. Green, of Brooklyn, N. Y.

Two minimum thermometers of the same maker.

A self-recording thermometer, of the manufacture of Richard Frères, of Paris, working in connection with an electrical register of the same manufacture.

Two psychrometers, made by H. J. Green, of Brooklyn, N. Y.

A self-recording wind vane and anemometer, also an anemoscope of Richard Frères, of Paris. This latter instrument electrically registers sixteen wind directions and the mean velocities in kilometers per hour.

An anemo-cinemograph, of Richard Frères, of Paris. This instrument gives the absolute maximum velocity of the wind in meters per second and is necessary in ascertaining the velocities of the gusts in the hurricanes.

A self-recording rain gage of Richard Frères, of Paris.

Besides these instruments, we had in the observatory the following miscellaneous apparatus:

An equatorial telescope, object glass 108 millimeters diameter, with diagonal eyepiece, micrometers, spectroscopes, and photographic equipment, all of the manufacture of Secretan, of Paris.

A theodolite, of Troughton & Simms, of London.

An astronomical clock, with mercurial cistern, manufactured by Gordon & Co., of London.

A ship's chronometer, of T. S. & J. D. Negus, of New York.

A transit instrument, of Troughton & Simms, of London.

II.—TEMPERATURE OF THE AIR.

6. The daily mean range of the temperature at the Vedado Park Observatory, Havana, during the month of January, as computed from nine years' observations (1887 to 1895, inclusive), is 9.2°. The minimum temperature in this month, occurring about 6 a. m., is on an average 65.2°. The maximum averages 74.4°, and generally occurs shortly before 2 p. m.

Mean annual and monthly temperatures in Havana, 1887 to 1895, inclusive.

Month.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	Means.
	°	°	°	°	°	°	°	°	°	°
January.	68.3	71.5	71.8	73.0	68.9	69.0	66.7	70.1	69.0	69.8
February	73.7	72.1	71.7	73.3	73.1	70.6	72.5	71.9	66.5	71.7
March.....	72.0	73.5	71.8	72.3	73.6	71.0	73.0	72.5	73.0	72.5
April.....	76.1	75.0	76.0	76.1	74.5	76.0	77.0	75.0	74.5	75.6
May.	79.0	78.0	78.7	78.9	76.9	78.1	78.6	76.3	77.5	78.0
June	79.1	80.3	81.3	81.0	81.9	80.0	80.5	79.5	81.5	80.6
July.....	82.3	81.9	81.6	81.3	82.7	81.9	82.5	81.7	83.5	82.2
August...	82.5	83.5	81.5	80.5	82.1	81.4	80.0	81.0	80.6	81.5
September....	80 5	80.0	81.7	79.5	80.8	80.6	79.7	80.4	81.0	80.5
October.....	78.0	78.3	76.6	78.7	75.5	76.5	78.1	76.0	77.9	77.3
November	73.1	74.7	75.6	74.1	73.4	72.3	73.3	73.7	74.3	73.8
December....	71.0	69.9	69.7	69.5	71.5	70.5	70.5	70.5	69.0	70.2
Means.....	76.3	76.5	76.5	76.5	76.2	75.6	76.0	75.7	75.7	76.1

Absolute maximum and minimum temperatures for the respective months from 1887 to 1895, inclusive.

Month.	Max.	Year.	Min.	Year.	Month.	Max.	Year.	Min.	Year.
	°		°			°		°	
January.....	81.1	1895	45.1	1887	July	95.5	1891	69.5	1892
February	85 0	1890	49.7	1895	August	93.9	1888	69.5	1894
March	88.5	1887	51.0	1890	September ..	93.7	1893	68.7	1890
April	90.3	1887	50.0	1891	October	89.0	1888	59.0	1890
May	93.9	1895	62.3	1891	November...	84.1	1894	53.1	1887
June.....	95.3	1891	67.3	1888	December ...	81.9	1887	49.5	1894

7. In July the daily mean range is 12°.0°, the minimum temperature being on an average 76.2° about 4 a. m. The

1888 he took an active interest in an unsuccessful effort to obtain funds from the Spanish Government for the exchange of daily cablegrams between the Spanish islands, on the one hand, and the Signal Office at Washington, D. C., on the other, hoping to establish useful forecasts of storms and northers. In August, 1889, a similar unsuccessful attempt was made; promises were favorable, but nothing was done. Meanwhile Mr. Luis G. Carbonell, of the Spanish navy and director of the Naval Observatory at Havana, undertook similar work, which is referred to in the Annual Report of the Chief Signal Officer of the Army for 1890, pages 12 and 216.

Owing to the internal troubles of Cuba, the active work at the Vedado Observatory ceased on December 31, 1895, and in January, 1896, the Director, del Monté, removed to New York City, leaving valuable apparatus stored in the public warehouse, where it was promptly destroyed by the Spanish populace; only that escaped destruction which had been placed in private custody. During his residence in the United States Dr. del Monté transcribed and arranged such records as had been saved from destruction, and in 1898 presented to the Chief of the United States Weather Bureau a memoir entitled: "The Climate of the Island of Cuba." The first portion of the memoir deals with the observations made at the meteorological observatory, formerly located at the Vedado Park, Havana, while the latter portion deals with the general question of hurricanes in Cuba. This latter will soon be published in a bulletin devoted to hurricanes, while the former portion we publish herewith, as containing climatological data for Havana that has hitherto been inaccessible to meteorologists.—ED.

maximum in this month averages 88.2°, between noon and 2 p. m.

8. The preceding table contains the monthly and annual mean temperatures in Havana for the years 1887 to 1895, inclusive:

III.—MOISTURE OF THE AIR.

9. The vapor tension at the Vedado Park, Havana, during the month of January, as computed from nine years' observations, is at a minimum, averaging 12.3 millimeters, about 6 a. m. The mean maximum is 13.7 millimeters, and generally occurs at 2:30 p. m.

10. In July the minimum tension averages 19.0 millimeters, about 4:30 a. m. The mean maximum is 21.1 millimeters, and occurs shortly before 4 p. m.

11. The maximum relative humidity at the Vedado Park, Havana, during the month of January, as computed from nine years' observations, averages 86 per cent about 6 a. m. The humidity is at a minimum at 2 p. m., averaging then 64 per cent.

12. In July the maximum generally occurs about 4 a. m., and averages 90 per cent. The minimum humidity in this month takes place between noon and 1 p. m., and is on an average 66 per cent.

IV.—PRECIPITATION.

Monthly and annual mean precipitation, and greatest precipitation, Vedado Park, Havana, nine years' observations, 1887 to 1895.

Month.	Mean.	Max.	Year.	Month.	Mean.	Max.	Year.
	Inches.	*Inches.*			*Inches.*	*Inches.*	
January	2.17	6.25	1889	August	5.65	9.30	1889
February	1.98	5.00	1889	September	7.29	13.01	1895
March	2.30	4.80	1891	October	9.50	13.60	1891
April	1.26	2.85	1887	November	4.50	7.50	1890
May	5.30	17.01	1890	December	2.15	5.65	1888
June	8.14	18.45	1892				
July	5 05	7.25	1890	Total	53.39		

V.—MEAN VELOCITY OF THE WIND.

The daily mean velocity of the wind, as computed from nine years' observations, shows intervals of calm attending the daily changes of direction. The secondary maximum occurs between 2 and 4 a. m., and on the annual average is 3.5 miles per hour.

The principal maximum velocity of the wind occurs between noon and 4 p. m., and averages yearly 11.5 miles per hour.

The daily absolute maximum velocity is on the annual average 17.5 miles per hour. The following table shows the mean velocity of the wind for each month of the year, as computed from hourly observations for nine years.

Month.	Miles per hour.	Month.	Miles per hour.
January	9.0	August	6.3
February	9.6	September	7.1
March	9.7	October	8.5
April	9.2	November	10.0
May	8.0	December	9.5
June	7.4		
July	7.0	Year	8.4

PHENOLOGICAL OBSERVATIONS ON THE POTOMA

By Prof. F. W. VERY.

At the special Weather Bureau station, temporarily established on Cobbs Island (post office address Rock Point, Charles County, Md.), Prof. F. W. Very reports the following notes relative to animal and vegetable life, under date of May 16:

The extremes of temperature have been rather trying. I have been interested in watching the spring changes and send you a few notes.

On my arrival (April 22) the following birds were already here: Red-winged blackbird, robin, bluebird, golden-winged woodpecker, brown thrush, long sparrow, swamp sparrow, chipping sparrow, boat-tailed grakle, meadow lark, warblers of several sorts, crows, sea gulls, killdee, plovers, turkey buzzards, the fish hawk, and swallows. Pear trees just coming into bloom. Cherry trees in full bloom. Shad bush in bloom.

April 25.—I walked through woods of pitch pine, long-leaved pine, and prickly holly, finding sassafras in bloom on the border and houstonia in the openings. Yellow warblers singing.

April 29.—Orchard oriole (new comer), green heron, king birds, far off heard song thrush, and rose-breasted grosbeak. Blackhaw (viburnum prunifolium) in flower all along the shore. Flowering cornel just beginning to bloom (columbine).

May 1.—Lilac in bloom.

May 2.—Pine trees in bloom and the waters of Neals Sound covered with pollen, thrown into wavy yellow veins (as in marbled paper) by the incoming tide. Willow oak in bloom.

May 6.—Garden white iris and wild blackberry in bloom.

May 8.—Oven bird and vireos singing. Hypoxis, potentilla, etc., in bloom.

May 10.—Whippoorwill singing.

May 13.—Wood pewee singing, and wild cherry in bloom.

In New England I have always regarded the coming of the wood pewee as a sure sign of settled summer weather.

May 14.—Locust trees in bloom. Hot and dry.

NOTES BY THE EDITOR.

DEATH OF MR. CYRUS ELLENBERGER.

In a letter dated San Francisco, Cal., April 6, 1900, Mr. Alexander G. McAdie says:

It is my sad duty to announce the death, on Thursday, April 5, of Mr. Cyrus Ellenberger, for many years a valued observer in the Weather Bureau. He had been on duty at this station since May, 1892, serving chiefly as chief clerk, and was regarded by all his associates as a painstaking, reliable, and faithful official. He gave the best years of his life to the work of the Weather Bureau, and was always willing to expend his energy in furthering the work of this office. For some time past he had suffered from a slow and painful disease, but he nevertheless very bravely stuck to his desk and performed the duties required of him.

STORM WAVES NOT TIDAL WAVES.

The Oregonian of Portland, Oreg., reports that a "tidal wave" did much damage at Ladysmith, Vancouver Island, April 6. On this same date severe storms and squalls prevailed on the coasts of Oregon, Washington, and British Columbia. The southwest winds accompanying such storms raise heavy seas and pile up the water in the rivers and harbors of this coast. All the reports that have been received from Victoria relative to the so-called tidal wave seem to show that it was due entirely to the wind, and might properly be called a "storm wave," but not in any sense a tidal wave. The latter class of waves have distinct characteristics and should not be confounded with the storm waves due to wind, and, occasionally, to barometric pressure.

AN ICE STORM.

During the month of March, of the current year, the vegetation in the New York Botanical Garden, on the Bronx

River, suffered many vicissitudes. There was frost almost every night, and the average temperature was only 35°, being the coldest for thirty years. On the 10th, the anniversary of the blizzard of 1888, the minimum was only 2° above zero. A vivid picture of the ice storm that prevailed during the 15–17th is published by Mrs. Britton, the wife of the director of the garden, in the first volume of the journal of the New York Botanical Garden. She says:

Notwithstanding the cold weather of the month, there have been warm, quiet days and abundant signs of spring. The hylas were peeping and the snow-drops were blooming in the nurseries on the 10th, and robins, meadow-larks, and song-sparrows had been singing. The sap of the sugar-maples flowing from broken twigs had made icicles several inches long during the night, and a few venturesome silver-maples had thrust out their pale stamens. On the 15th the second snowstorm of the year arrived, quietly piling up eight inches of snow on the level, and changing to sleet during the night. The next morning dawned clear and cold, the sky was blue and cloudless, and every common thing stood transformed to crystal, tinkling with icicles and hung in prismatic rainbows.

We may look to the authorities of the New York garden for phenological records that will permit full and reliable comparison with similar data from other parts of the world, and with that for the early years of our own settlements.

Three meteorological stations have been established in the garden. Station 1 is located in the herbaceous grounds. Station 2 is on a low ridge in the center of the hemlock forest. Station 3 is in the central portion of the elevated plain of the fructicetum, which is bordered on the east by a deciduous forest, and on the south by artificial lakes and the hemlock forests. The thermometers are contained in shelters of the United States Weather Bureau pattern. This new meteorological station is about 12 miles northeast by north from the regular Weather Bureau station. The record at botanical garden, station 1, for April is as follows: Precipitation, 2.39 inches. Maximum temperatures, 77°, at 2 p. m. on the 30th. Minimum temperatures, 21.5°, at 6.30 a. m., on the 10th.

STORM IN YUCATAN.

A report from Merida, Yucatan, states that "a terrific hurricane struck here April 23, resulting in great loss of property." On that date an extensive area of low pressure had its southern extremity in the Gulf of Mexico, and severe local storms may have prevailed in that region, but nothing sufficiently extensive to be called a hurricane seems likely to have occurred. Apparently, this is another case of the reportorial use of high-sounding words. A destructive wind may be a norther, a tornado, a thunderstorm gust—it may even be called a wind of hurricane force—but it is not a hurricane. The latter term applies to a destructive wind circulating about a local area of low barometric pressure, and moving day after day along the surface of the earth. Later in the summer the local storms of the West Indies and Gulf of Mexico may develop into grand hurricanes, but these are not likely to occur so early as April or May.

LOCAL ANEMOMETRIC PECULIARITIES.

In the annual report for 1899 of the Fernley Observatory, at Southport, England, lat. 53° 39′ 24″ N.; long. 2° 59′ 3″ W., therefore, about twenty miles north of Liverpool, the meteorologist, Mr. Joseph Baxendell, gives some accounts of experiments with the pressure tube anemometer devised by Dines, but essentially based on the principles involved in the Hageman anemometer. He says:

Although no very thorough or detailed comparison between the indications of the Dines pressure tube anemometers at the Hesketh Park Observatory, and the Marshside station has yet been made, the average difference between the wind force at the two situations is so remarkable that it may be of interest to give, without further delay, the monthly mean values of wind velocity during 1899, at the respective stations.

The "head" of the Dines instrument at Hesketh Park is 36 feet above the summit of the highest hill or knoll in the town, and 26 feet above the top of the roof of the Fernley structure, by which the knoll is capped. It is 85 feet above mean sea level. Some further idea of its exposure and surroundings may be obtained from an inspection of the frontispiece to the annual report for 1897.

The "head" of the Dines anemometer at Marshside is 50 feet above very level ground, and 40 feet above the roof of the brick hut. It is 66 feet above mean sea level. In this case there is a very open exposure, and a large majority of winds reach the instrument without having previously encountered any seriously deflecting or obstructing object.

Mean velocity of the wind.

1899.	Hesketh Park. Miles per hour.	Marshside. Miles per hour.	1899.	Hesketh Park. Miles per hour.	Marshside. Miles per hour.
January	7.0	14.0	August	4.8	10.0
February	6.5	10.5	September	8.3	18.0
March	5.2	12.1	October	4.5	11.7
April	8.0	14.0	November	7.1	15.5
May	4.4	8.9	December	5.0	10.7
June	3.9	8.9			
July	4.6	11.8	Year	5.8	12.2

Every possible precaution has been taken to insure the accurate working of the two instruments. The one at Hesketh Park has been dismounted and entirely refitted, the pipes also being tested, but the differences continue as before.

Although these two anemometers are not very far apart yet there is *a priori* no special reason for surprise at the great difference between the two records. When the wind blows over an obstacle, or a series of obstacles, there is at once produced a systematic derangement in the otherwise steady streams of air which are now thrown into violent contortions and the individual currents so interfere with each other as to greatly diminish the average velocity of the wind over a large region in the rear of the obstacle. An exploration of the surrounding region usually shows that the wind is blowing its full strength in various unexpected places, between which are found minor currents due to the obstacles. Above and outside of these currents the wind also blows with full strength.

In the present case the winds reach the Marshside anemometer with much less interruption from distant trees and structures, and we can but believe that the records for the two stations differ from this reason only and not because of errors in the apparatus.

THE SEASONAL RAIN IN COLORADO.

In the annual summary of the Colorado section Mr. F. H. Brandenburg, Section Director, gives not only the annual numerical tables, but a general review for the winter 1898–99, from which it appears that much more than the normal amount of snow fell, forming vast drifts, so that on July 1, 1899, a much greater amount was stored in protected places at great altitudes than usual, giving good prospects for a steady flow in summer. Mr. Brandenburg also contributes a chapter to a discussion of long-range or seasonal forecasts. He shows that, so far as concerns the temperature records at Denver, the average temperature for a season, or a longer period, has apparently no connection with the temperature of the coming season; that, in general, an exceptionally warm spring or summer does not follow an abnormally cold winter. The compensations occur, not in the immediately following seasons, but at uncertain intervals of time.

With regard to precipitation at Denver, he finds that nota-

bly dry or wet seasons are more likely to be followed by nearly normal seasons than by the complementary characteristics; so that here again, as with temperature, it is not true that a warm or a dry winter is followed by a cold or wet summer, or vice versa.

FRESHETS IN JAMES RIVER, VA.

The annual summary of the Virginia section contains an excellent article on the combinations of circumstances that bring about freshets in the James River, We copy the following table showing the principal freshets during the past thirty years. Concerning these cases, twenty-six in all, Mr. E. A. Evans says:

Fourteen, or 54 per cent, occurred during months when the absorption by the soil and the evaporation by the wind were at a minimum; five, or 19 per cent, when evaporation was greater, but absorption was retarded by the prior sodden condition of the ground; seven, or 26 per cent, occurred when both evaporation and absorption were at a maximum, but when the rate of rainfall was greater.

Maximum river gage readings showing height above low water during important freshets in the James River, Va.

Date.	Lynchburg.	Scottsville.	Columbia.	Richmond.*	Ratio of Columbia to Richmond.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Per ct.*
October, 1870	14.4	28.8	39.0	27.0	69.3
November, 1877	11.8	26.3	37.5	28.6	76.3
March, 1884	9.8	14.0	20.0	13.7	68.5
March, 1884	12.2	17.4	24.0	15.7	65.4
October, 1885	13.0	16.2	30.5	15.9	52.1
November, 1885	.....	.....	30.5	14.2	46.4
January, 1885	.....	17.0	24.0	14.7	61.1
April, 1886	10.8	22.5	32.0	24.3	75.9
July, 1886	.....	.....	23.8	17.2	72.3
August, 1889	.....	.....	29.5	22.5	76.3
June, 1889	.....	.....	32.5	25.2	77.5
April, 1891	.....	.....	20.5	14.4	70.2
January, 1892	.....	.....	20.3	13.5	66.5
May, 1893	13.9	17.8	27.0	16.9	62.6
January, 1895	10.5	18.4	28.3	18.2	64.2
March, 1895	.....	.....	20.0	12.7	63.5
April, 1895	15.2	19.2	26.0	16.4	63.0
July, 1896	10.2	14.2	19.3	12.5	64.9
October, 1896	15.7	.....	28.5	16.7	58.6
February, 1897	.....	.....	21.7	11.9	62.6
February, 1897	.....	17.5	26.2	15.0	65.3
October, 1898	12.0†	.....	.....	11.7	.....
January, 1899	8.6†	.....	.....	13.5	.....
February, 1899	5.6†	.....	.....	22.0	.....
March, 1899	19.0†	.....	.....	20.5	.....
March, 1899	7.7†	.....	.....	13.6	.....

*Readings taken from United States James River improvement gage until 1897, when they were taken from Bureau gage. †On Bureau gage.

PHENOLOGY IN OHIO.

In the annual summary of the Ohio section Mr. J. Warren Smith, Section Director, discusses the question of the relation of temperature to the date of harvesting wheat. The harvest data for twelve consecutive seasons at Wooster, Ohio, and for forty-four consecutive years at Osborn, Ohio, are compared with the mean temperatures and total rainfall of April, May, and June at the same or neighboring stations. In general, Mr. Smith finds that the dates and the temperatures fluctuate together, the dates being earlier in proportion as the mean temperature of the three months is above the normal and late when the temperature is below the normal. On the contrary, the precipitation varies inversely as the date; a deficit in rain causes an earlier harvest. Thus in 1899 the date of harvesting was the earliest on record, coinciding with the greatest recorded deficiency in rainfall.

As this study relates to winter wheat, we may remark that it has been customary for European students usually to calculate the sum total of the effective temperatures from the date of sprouting, and it is likely that such calculations would have made some appreciable differences in the Ohio temperatures. With regard to precipitation, we are inclined to think that the acceleration of the date of harvest by droughts and clear weather, or its retardation by rain and cloudy weather is mostly effected during the three months, April, May, and June, tabulated by Mr. Smith. However, we think that the total temperature or rainfall for the month of June ought scarcely to be considered in studying those years in which the wheat ripens as early as June 20.

As the dates of harvesting winter wheat may be needed by others in climatological studies we reprint the figures given by Mr. Smith. On the average, the Wooster date is 6.6 days later than the Osborn date:

Dates of harvesting wheat.

Year.	Osborn, Ohio.	Wooster, Ohio.	Year.	Osborn, Ohio.	Wooster, Ohio.
1856	June 28	.....	1878	June 25	.....
1857	July 16	.....	1879	June 27	.....
1858	July 1	.....	1880	June 21	.....
1859	June 28	.....	1881	.....	.....
1860	June 25	.....	1882	July 4	.....
1861	July 1	.....	1883	July 6	.....
1862	June 30	.....	1884	July 3	.....
1863	June 30	.....	1885	July 9	.....
1864	July 1	.....	1886	June 28	.....
1865	June 29	.....	1887	June 23	.....
1866	July 6	.....	1888	July 4	July 8
1867	July 1	.....	1889	June 29	July 3
1868	July 6	.....	1890	June 27	July 3
1869	July 5	.....	1891	June 27	July 1
1870	June 25	.....	1892	June 29	July 2
1871	June 26	.....	1893	July 3	July 8
1872	July 4	.....	1894	June 28	July 8
1873	July 1	.....	1895	June 25	July 6
1874	June 26	.....	1896	June 22	July 3
1875	July 12	.....	1897	July 2	July 7
1876	July 1	.....	1898	June 23	July 2
1877	June 29	.....	1899	June 20	June 27

HAIL AND ITS METHODS OF FORMATION.

In the March report of the Virginia section Mr. E. A. Evans, Section Director, gives some interesting items with regard to the unusual features of the snowstorm of March 25, 1900:

The morning of this date was cloudy, with a fresh, chilling, northeast wind. The temperature rose slowly during the forenoon, and at 1:17 p. m. a light rain began to fall. Soon sleet accompanied the rain, and later the rain ceased and sleet alone fell. Some of these icy particles were nearly cubiform, measuring perhaps one-fourth of an inch either way. Mixed with these was the sleet ordinarily seen—the small spheres of frozen rain. At 5:25 p. m. moist snow fell with sleet. At first the flakes were not large enough to be specially noticeable, but as the fall of sleet diminished in volume, which it immediately did, the size of the flakes increased until they attained unusually large proportions. They were of irregular shape, mostly oblong; several were seen the greatest diameter of which could hardly be covered by a teacup. Some were caught upon a piece of dry wood and examined. In every instance the center of the flake was composed of a soft mass of snow about half an inch in diameter, while the outer edges were thin, looking as though they might have been separate flakes which had attached themselves to the central mass while it was falling. The weight of the center being greater than that of the edges caused the larger ones to assume the form of an inverted cone in falling, the outer edges being bent up by the resistance of the air.

Three of the large flakes were caught in a bowl, yielding, when melted, nearly a tablespoonful of water. There was nothing at hand from which an absolute measurement could be had, but it is estimated that it would have closely approximated one one-hundredth of an inch. The flakes were widely separated from one another and did not obscure the vision in looking upward toward the sky.

The above interesting description reminds one of the natural snowballs described by the observers on Pikes Peak during the early years of the occupation of that station. These balls are said to have been 2 or 3 inches in diameter, and it was supposed that by melting and recongealing as they fell they formed icy hail with snowy nuclei. In the present case the lenticular snowflakes are said to have had a denser mass of

snow at the center, while the outer rims seemed to have been composed of separate plates, attaching themselves to the central mass as it fell. By some such process as this the remarkable hailstones that figured in the MONTHLY WEATHER REVIEW for April, 1877, might have been formed.

There are many reasons for believing that hailstones are formed in the free atmosphere by some one of several different processes, each of which may be in accord with the laws of thermodynamics:

1. An ascending mass of air may be so dry that it does not cool to the dew-point until far below the freezing temperature, in which case the deposit is either fine spiculæ of ice or aggregations of these into small snowflakes.

2. If the dew-point is a little higher than the preceding, the cloudy condensation may occur at temperatures just above the freezing point and the watery particles may be carried up a little higher and frozen into what is called frozen fog. These same particles, when driven by the wind against an object, accumulate on it as frostwork.

3. When a rising mass of air forms a large cumulus cloud at a low level, having a rapidly ascending current in its interior, the latter, by its buoyancy, will rise much higher than if there were no cumulus cloud; it may pass upward into the so-called hail region, where water drops and ice particles may coexist, and still higher up into the region where only ice and snow can exist.

4. Raindrops falling from relatively warm clouds through a very cold stratum of air below may be frozen into sleet before they reach the ground.

To these four elementary methods of forming atmospheric ice we have to add the mechanical processes by which the small particles accumulate as large hailstones. Undoubtedly much light was thrown upon this subject by the notes made by our observers on Pikes Peak, some of which are quoted, as follows, beginning with those by Mr. Robert Seyboth, as quoted in the MONTHLY WEATHER REVIEW for June, 1874:

The observer on the summit of Pikes Peak states that the local storms there experienced come from the northwest, west, or southwest, and evidently originate over the central portions of the parks on hot afternoons. One such storm approached his station under conditions very favorable for observation, and he noted that while the cloud-bearing currents of air flowed toward the rotating center from all directions, they also had a decided downward movement, but that through the interior, funnel-shaped masses of smokelike vapor rapidly ascended.

1874, July 1, a heavy thunderstorm passed over the summit from southwest to northeast, between noon and 2 p. m., and sleet of remarkable size fell during its progress. The stones were of hard snow without nucleus, and many of them as large as pigeon eggs; violent cloud whirls were observed before the beginning of the sleet, the wind backing to the southeast, with falling temperature.

1874, July 21, heavy hail began at 2.05 p. m., some of the stones varying in size, and composed mostly of solid transparent ice. The hail came down in continuous torrents until 7.30 p. m., when it was succeeded by light rain; the lightning was terrific and simultaneous with the thunder. The storm did not extend much beyond the Peak.

1875, May 29, hail from 11.30 a. m. to 1.40 p. m., accompanied by electricity. The observer notes that in all hailstorms the fall of hail entirely ceases for about half a minute following a heavy electric discharge, and that the hailfall is considerably heavier for some little time following the discharge than before. Some of the stones collected were as large as peas, almost round, and formed of hardened snow. The observer failed to discover the whirling motion in front of the cloud, as described by Professor Loomis.

1875, August 10, from 3 p. m. to 8 p. m., occurred the heaviest hailstorm the observer ever saw. The stones averaged an inch in diameter, while those fully two inches in diameter were not rare. On being broken they presented a stratified structure with a center of clear ice, the outer covering being of soft snow. The electricity was not so strong as during some minor storms.

1876, April 23, hail began at 9.45 a. m., and continued until 2.30 p. m.; falling very heavily at times and accumulating on the crest of the snow to the depth of an inch. The stones were not solid ice but hardened snow, without any appearance of nucleus, and of all sizes up to that of a pea.

1876, June 15, 7.30 p. m., a hailstorm began which continued with great fury for 20 minutes, and at intervals afterwards. At first the stones were quite small, not larger than peas, but after a few moments they were of greatly increased size, many of them being at least an inch in diameter. They had a decided nucleus around which were plain concentric formations. The nucleus uniformly consisted of hard white ice, while the concentric rings were of transparent ice, either solid or spongy, except the outer one, which was of snow. As the stones fell on the tin roofs over our heads they made a deafening noise; thunder and lightning accompanied the storm in very liberal amount.

1876, August 6, hail began at 1:55 p. m., but soon turned to snow, which fell in very large flakes.

1877, October 12, at 11 a. m., a heavy cloud came over from the west and enveloped the Peak; violent thunder followed. At noon the summit was in the midst of a very heavy thunderstorm, which passed to the plains at 1 p. m., affording an excellent observation on the formation of hail. The rotary movement of the hail cloud could plainly be seen and with every violent flash of lightning the passing cloud would grow perceptibly darker, indicating increased condensation. The hail formed by this cloud must have fallen about three miles below, for the wood packers reported white solid hail at timberline and none above. This verifies the theory that a hail cloud can be transported laterally several miles while the ice stones are forming.

1878, May 8, sleet commenced at 4 p. m. and continued into the night. The progress of this storm was observed with great interest with reference to the origin of rain. It would seem from this sleet that Hutton's theory of rain is not based on mountain observations and the observer is now led to believe that the origin of our summer rains is the same as that of hail, and that two masses of air never come together or collide in such a manner as to produce direct and copious precipitation. It is believed that every raindrop has its origin in a compact ball of snow which melts in descending through warm air.

1878, May, 11, heavy hail. * * * Each hailstone consisted only of compact snow, which when melted made but a drop of water.

1878, June 10, heavy hailstorm. * * * Balls of compact snow fell fully half an inch in diameter.

1878, June 29, during the afternoon a most wonderful storm was witnessed in South Park, about 50 miles away. Small fragmentary clouds coming from the snowy range assembled rapidly in dark masses which assumed the shape of an inverted cone. The cone once formed, small clouds could be seen drifting rapidly in all directions from the center. At 4 p. m., the inverted cone, having been nearly stationary for about forty minutes, suddenly began to rise like an immense balloon and upon attaining considerable height, gradually lost its form and soon after dissipated. A white spot of 10 or 15 acres showed that this had been a tremendous hail waterspout; the hail did not disappear until nearly sunset.

1879, April 26, at 2:45 p. m., a severe storm came from the northwest, with heavy thunder. During the continuance of this, from 3:07 to 3:20 p. m., 2 inches of sleet and hail fell, ranging from one-eighth to one-half inch in diameter. Every piece examined was in the shape of two cones, joined at their bases, with streaks from the center to each cone, and looked as though they had been under heavy pressure and had popped out, or the pressure had slid off, forcing them together at the base. There was no ice in their composition though they were hard; they could be crushed between the thumb and finger, when they would crumble into fine snow, and before they were mashed they were as white as snow. During this heavy fall of sleet loud peals of thunder followed one another in quick succession. The wind was very changeable between north and west, showing decidedly more than one current, as it changed suddenly from north to west and reverse.

1879, May 14, snow began at 1:40 p. m.; ended at 2:30 p. m. The first that fell was a round solid mass, the form of hail and about the size of buckshot. It was not frozen and could be easily crushed in the hand. Shortly after it changed to light snow.

1879, July 10, a severe hailstorm began at 2:15 p. m., accompanied by terrific thunder and intense lightning. At 5 p. m. the hail turned to snow and ceased at 5:30 p. m. The wind was gentle throughout.

1879, July 15, one of the most severe hailstorms began at 3:27 p. m., most vivid lightning; the hail was the size of bullets; the storm ended at 5:15 p. m.

1880, June 18, at 2:30 p. m., light snow fell from a small thunder cloud over the Peak until 3:15 p. m.

1880, July 23, at 11 a. m., the Peak began to be enveloped in a dense mass of clouds and a heavy fog, and at 12:30 p. m., a hailstorm set in. Intense ground currents of electricity quite frequent.

1880, August 3, hail with terrific lightning; at 12:50 p. m. the hail changed to snow and the lightning diminished.

1880, October 26, at 12:50 p. m., a heavy thunderstorm from the north, with light snow and heavy sleet at intervals.

1881, June 2, hail and light snow at intervals from 1:35 until 6:45 p. m. The hail was accompanied by terrific lightntng.

1881, July 2, 11:45 a. m., a heavy fall of hail with terrific lightning continued until 12:30 p. m.

1881, July 4, hail at 11:10 a. m., and continued at intervals until 11:40 a. m., when it turned into light snow and so continued until 4:54 p. m., when it turned into a heavy rain, which continued falling until the midnight observation (9:07 p. m., local time).

1882, June 7, the summit was densely enveloped, and a heavy sleet began at 3:45 p. m., continuing at intervals until 8 p. m., when the wind, previously calm, suddenly began from the south at 20 miles per hour, and the sleet changed into heavy dense snow with a flash of lightning from the north. During the fall of sleet the peculiar singing or sizzing noise was heard on the wire. From 8:45 to 8:55 interesting electrical phenomena were observed, accompanied by dense driving snow, all of which then ceased suddenly.

1882, July 12, a thunderstorm, with hail and sleet. At 4 p. m., during the heaviest hailstorm, and when the wind died down to a calm, the observer went out to examine it as it fell on the roof in a deafening storm. The largest of the hailstones were an inch in diameter, of a balloon shape, not round and much harder than any ever seen by the observer, requiring a heavy blow with a rock to crack them.

1883, June 24, sleet and hail fell from 1 p. m. to 2:30 p. m. Some of the larger hail was fully one and a quarter inches in diameter and was very peculiar both in shape and composition. There were no icy layers or rings of ice, but the whole body of the stones was of a light porous nature. In shape they resembled a balloon, the smaller end coming nearer to a point. The smaller stones were nearly perfect spheres.

1885, August 29, thunderstorm from the northeast moving southward from 5:45 p. m. to 6:12 p. m., accompanied by sleet and hail. Hailstones, spherical, of opaque snow formation, four-tenths of an inch in diameter; during fall of hail the atmosphere was highly electrified; the usual buzzing noise, resembling that of bees, came from all pointed objects, as during every electrical storm in its passage over the Peak.

In the thermodynamic studies of Hertz and von Bezold is employed the expression "the hail stage," viz, that stage in which the temperature of 32° prevails in an ascending mass of moist air. It is supposed that the ascending air, having already cooled to the dew-point, is carrying up with it a quantity of water, either in small cloud particles or in large raindrops. When these have ascended to the level where the rising moist air is cooled to the temperature of freezing, they continue to give up to the air a little of their specific heat until they are themselves frozen into hail or sleet. There is, therefore, a thin layer of air in which this process of freezing is going on and where the rising mass of mixed air and rain is kept at a uniform temperature until all the water is converted into ice. This is spoken of by Hertz as the hail stage; below it is the rain stage and above it is the snow stage. In this latter region the ascending air, being already cooled below the freezing point, can deposit its moisture only as snow or small crystals of ice. Now, the actual hailstones observed on Pikes Peak are so frequently composed of snow that has been partly melted and refrozen, or mixed with water drops and refrozen, that we can not suppose them to have been wholly formed within the thin layer known as the Hertzian hail stage. It is more likely that they are formed partly within that and partly within the Hertzian snow stage. The memoir of Hertz assumes throughout that the changes of temperature within the ascending air are strictly adiabatic. This requires that the ascent be so slow that the drops of water carried upward maintain the same temperature as the surrounding air. But these two conditions are almost physically incompatible; it is probable that neither of them are ever realized in nature. Among other combinations that are possible and may help to explain the great variety of forms of hailstones that are caught upon the summit of Pikes Peak, we may suggest the two following as the most common:

1. Frozen raindrops carried very rapidly upward through the Hertzian hail stage may continue on into the snow stage and grow by the accretion of snowflakes until they are finally dropped to the earth, in which latter process they continue increasing their snowy covering. If, however, they pass through the hail stage before they reach the ground in their fall, they will be found to consist of an icy nucleus surrounded by a snowy envelope and covered over all by a layer of a frozen mixture of ice and snow.

2. Air that has ascended into the snowy stage without going through the rain or hail stage, or, at least, to a very slight extent, because of its dryness, may form large snowballs high above the Peak before beginning to fall. As such balls descend very rapidly, the interior retains a low temperature, while the exterior is slightly warmed and melted by the action of the warmer air that the snowballs find near the ground. The result is large hailstones, consisting each of a thin layer or crust of ice and a snowy mass within.

3. In the formation of snow and hail in the midst of ascending currents of air, we must expect to notice the same phenomenon as in the formation of rain, viz, after the first condensations have taken place upon dust and foreign substances the rising mass of cloud represents dustless air in the presence of water particles, but cooled by expansion to such an extent that the air between the drops, or the ice spiculæ, is in a state of supersaturation. When this condition has become too intense, large quantities of aqueous vapor suddenly condense, rushing together into large drops of rain or large masses of snow, and carrying with them all the finer particles within their respective spheres. At the very low temperatures at which this occurs, water will hold considerable air in solution, and additional air is also included at the center of the snowball among the particles of snow and ice. Such large snowballs are heavy enough to descend rapidly from the snowy stage, through the rain and hail stages to the ground, and in so doing they become saturated with water which recrystalizes forming solid hailstones, but at the center of the mass they still hold, confined, the air originally included in the snowball, and this is compressed under several atmospheres, as was shown in 1869, by P. Reinsch (see Pogg. Ann., 1871, or L. E. D. Phil. Mag. 1871, Vol. XLII., page 79), who observed that when such hailstones are melted under water the little bubble of air at the center is seen to suddenly escape and expand sufficiently to demonstrate the existence of a pressure of 50 atmospheres under which it was confined. In this formation of snowballs and the resulting hail from supersaturated air within the snow stage there is an electric disturbance entirely analogous to that which takes place when great drops of rain are formed within the rain stage. In both cases violent thunder and lightning are observed just before the fall of the hail or the rain.

These and other hypotheses that might be framed relative to the methods of formation of the various kinds of hailstones must, however, only be regarded as suggestions intended to stimulate experimental and theoretical research in this direction. One can not doubt but that the history of the formation of hail is written in its structure if we could but interpret it.

STUDIES IN RAINDROPS.

In Popular Science for May, 1900, Mr. W. A. Bentley gives the results of some studies by himself on raindrops.

He catches the drops on a tray full of ordinary flour and finds that the pellet of dough formed at the bottom of each impression is very nearly the actual size of the original raindrop, which vary in diameter from one-fiftieth of an inch to one-fourth of an inch. He finds that the small raindrops are most commonly formed in the lower nimbus or upper cirro-stratus clouds when the intermediate cloud strata are totally absent, or nearly so. Small drops usually form the greater part of the rainfall on the outer edges of the showers and rainstorms, and a large part of the rainfall in all great storms. As a rule the size of the drops progressively increases as we pass from the outer edges to the central portions of showers and rainstorms. The larger drops originate in the upper and intermediate cloud strata, and a vast vertical depth of these clouds is usually necessary to their formation; they frequently come thence with no low clouds present below. The largest drops of all descend from newly formed or forming thundershowers, when cumulus clouds are expanding upward into the cirro-stratus crest that soon forms above and overhangs such showers. Newly formed or forming portions of older showers, and certain circumscribed central portions within the great rain storms, also shed large drops, but rarely are they so large as are those of thundershowers.

The drops of newly formed showers are often large to the extreme edge of the shower, and the rainfall portions of such showers often consist of large and medium drops alone, without small drops intermixed with them. Sometimes large drops fall scatteringly and alone, but more frequently they are associated with both medium and small

drops. The drops from the receding edges of showers and storms are more commonly of larger size than are those of the advancing edge.

A most interesting fact observed is that lightning flashes originate most frequently in that portion of the cloud depositing heaviest rainfall and largest size drops. Here may be the explanation of the absence of lightning flashes in certain showers, as well as the excess of it in others; one may be producing small drops, the other very large ones.

The above results of Mr. Bentley's special study seem to harmonize closely with the Editor's general experience and many special observations that he also has made. Large raindrops seem to require for their formation rapid upward currents; small raindrops and cloud particles are produced in gently rising currents. Fine and gentle rains may fall from the thin horizontal cloud strata that are formed by mixture at the boundary between two currents of different temperatures flowing past each other, but larger drops and heavy rains require a decided cumulus type of cloud and rapidly cooling masses of supersaturated air. Lightning always attends the formation of these large drops of rain or the analogous large snowballs from which hailstones are formed. The hypothesis submitted by the Editor in 1892, and reproduced in Agricultural Science in 1892, Vol. VI, p. 307, from which we make the following extract, still seems to be worthy of experimental investigation.

THE FORMATION OF LARGE RAINDROPS.

In an article on the production of rain, published in Agricultural Science for 1892, Vol. VI, p. 297–309, the present writer reviewed the various hypotheses that have been suggested as to the method of formation of rain, hail, and snow and the possibility of preventing destructive storms. At the close of his article the author said:

As to these various hypotheses that have been suggested concerning the method by which the agglomeration of droplets into large drops is actually effected by nature in her regular process of making rain, I must remark that it is not yet clear to me that any one has demonstrated that small drops actually do agglomerate into larger ones to any considerable extent. I think it quite possible that the union of small cloud particles into larger ones is only effective in driving fogs, or in clouds whose upper surfaces cool by radiation, but is, after all, not an important feature in the natural production of generous rains and summer thundershowers. It is a reasonable working hypothesis that the particles which were originally too small to fall from the clouds with any rapidity actually remain there entangled in the currents of air that characterize clouds, and that they are subsequently evaporated, while, on the other hand, only those fall as rain which, originally, had a size vastly larger than the average size of the smaller particles that constitute the major portion of a cloud. There may be some reason why the condensation of the superabundant molecules of a saturated vapor should form not merely cloud particles whose diameter is ordinarily less than one-hundredth of an inch, but also here and there, large drops which fall to the ground as rain with very much the same size as when originally formed a few moments before in the clouds. The sudden pour of heavy rain from a limited region within a thunder cloud can not be due to a general slow progressive agglomeration of droplets into drops.

On this point I submit the following modification of ideas suggested by reading von Bezold's fourth paper "On the Thermodynamics of the Atmosphere, Berlin, 1892." It suggests a new point of view, and one that demands further experimental elucidation.

Von Bezold suggests that the heavy rains generally known as cloudbursts are immediately preceded by, and may owe their origin to, a supersaturated state of the atmosphere, by reason of which a greater quantity of vapor is contained in the air than would under other conditions be possible at a given temperature. Following out this hypothesis I conclude that whatever molecular condition it be that permits the existence of a supersaturated atmosphere, it is evident that the removal, or annulment, of that condition must give rise to an immediate and heavy condensation. This principle may be extended to all ordinary rains as well as to the violent thundershowers and cloud-bursts.

The supersaturated condition must be considered as a case of adiabatic expansion,[1] accompanied by a delay in the occurrence of the appropriate condensation; so far as we at present know, this condition can occur only in those cases where all foreign substances, or dust particles, are absent, which might serve as nuclei for the formation of fog particles. A slowly rising and cooling atmosphere first condenses its moisture on the dust nuclei and forms minute droplets; these grow very slowly, by diffusion, up to a definite size proper to the prevailing temperature and vapor tension, but the intermediate air, in which these droplets are floating, keeps on cooling as a dust-free supersaturated vapor. If the sun shines on these droplets its heat powerfully contributes to evaporate them and further saturate the surrounding air.

In general, therefore, the ascending portions of every cloud contain supersaturated, dust-free vapor separating the isolated droplets. When by further expansion and cooling the supersaturation has proceeded to such an extent that further condensation must occur, this latter molecular change permeates the supersaturated space with a rapidity comparable to that with which any other chemical change takes place, just as when the explosive union of chlorine and hydrogen, or of oxygen and hydrogen, starting at any one point, almost instantaneously permeates a mass of those mixed gases, or, as when combustion runs along a train of gunpowder. The vapor molecules from the supersaturated spaces are quickly brought together by their molecular attractions into heavy drops of warm water, which are often distinct from the intermediate cooler droplets, and descend rapidly from the clouds, while the latent heat of condensation is communicated to the adjoining air and is left behind in the cloud. Thus simultaneously with the formation and fall of the big drops there is a sudden expansion of that portion of the clouds from which they came. Von Bezold thinks that such expansion may possibly be felt at the earth's surface as a sudden rise in the barometer, while it is also visible to the eye as a sudden expansion of the cloud into the so-called thunder head. I myself doubt whether there would be any appreciable barometric result, yet I consider that the sudden expansion and ascent of the white cloud and its subsequent rapid dissipation into the surrounding air, together with the simultaneous lightning, thunder, rain, hail, and ascending whirl of wind, all conspire to make it very plausible that there really existed a supersaturated condition at the moment immediately preceding.

If the temperature of the dew-point of the ascending air, or the temperature of supersaturation is below freezing, the condensation of the vapor may at once form, not drops, but large snowflakes, such as will fall rapidly to the ground, or the small hail that is ordinarily called sleet.

Correlated phenomena occur when a cloud consists of small particles of water cooled below the freezing point, as is known to be frequently the case. When for any reason these particles are suddenly converted into ice, as will happen when they are cooled low enough or when they jostle against each other, their temperatures at once rise to the freezing point, a large quantity of heat is set free, the cloud expands and rises, and the droplets of water are converted into spiculæ of ice, or small snowflakes; large flakes and hailstones are not to be explained in this manner.

There is some plausibility in the hypothesis that the critical electrical condition, which results in lightning, is directly due to the disruption of the condition of extreme supersaturation and the sudden formation of large drops of water, or to the disruption of the condition of water cooled below the freezing point, and the consequent sudden formation of ice or snow, but this remains to be investigated.

Therefore, according to this latest view of the subject, the problem of the artificial formation of rain will be partially solved and, sufficiently so for practical purposes, if some method is invented by which to bring about a sudden formation of a small percentage of large drops out of the moist air that exists between the small particles of every cloud.

At present our attention and experiments should be directed toward understanding and completing the natural and obscure process involved in the formation of rain within the cloud and not toward the forcing of any unnatural process.

[1] Without adding or subtracting heat.

PHOTOGRAPHY IN METEOROLOGY.

The art of photography has proved such an exceedingly useful method of studying and exhibiting meteorological phenomena that it behooves us to stimulate its development and application in every practicable way. Photographs of clouds for the purpose of securing types of the different classifications began to be made as early as photography technically so-called was invented, say, about 1845 (?), and immediately replaced the less satisfactory daguerreotype method of 1839. The use of colored screens, absorbing cells, and polarizing plates which cut off the diffuse light and blue light of the sky, has contributed to the perfection of cloud photographs.

The application of photography to determine the heights

and movements of clouds has only been satisfactorily developed within the past ten years, although it was undoubtedly suggested and tried as early as 1857. The study of lightning, by means of photography began, we believe, with the work of Dr. H. Kayser, of Berlin, in 1884, and von Hænsel in 1883.

In studying the distribution of polarized light over the sky it may be practicable to so arrange the apparatus that the relative amount of polarization may be deduced by photographed records, so as to give a general view of the condition of a large portion of the sky. The record of the amount of sunshine and cloudiness by the so-called Jordan sunshine recorder is well known, although this is strictly speaking a blue print rather than a photographic process. A photograph of the distorted disc of the sun near the horizon, if one could be taken, would be a record of the irregularities of atmospheric refraction, and, therefore, of the density of superposed layers of air.

Photographs of snow crystals, frost work, sections of hailstones, views of waterspouts and tornadoes, halos, rainbows, and glories are not rare. Even the waves of compression in the atmosphere attending a bullet or an explosion, or any wave of sound, as also the streams of mixed warm and cold air flowing around an obstacle have been photographed.

Those meteorologists who take a personal interest in all these applications of photography will appreciate the efforts that are being made by the Royal Photographic Society of London to extend the scope of its annual exhibitions to every branch of photography and its applications. Those who have interesting photographs or photographic apparatus that they wish to exhibit should communicate directly with Mr. John A. Hodges, Honorary Secretary, No. 66 Russell Square, London, W. C. The exhibition will be opened on October 1 and medals will be awarded.

The exhibition will be arranged in five sections, of which the last is entitled Scientific Photography and Photography in its Technical Applications. Under this head, the circular reads as follows:

> This section will comprise examples of work shown for its technical qualities and apparatus used in photographic investigations: The various processes of color photography; the photographic reproduction of paintings, drawings, maps; photographs by artificial light; photography applied to industrial and educational purposes, astronomy, spectroscopy, geology, meteorology, microscopy, medicine, surgery, and the Röntgen rays; surveying and engineering; zoology and botany; telephotography, new processes, enlargements; photography applied to military purposes, recording instruments, etc.; negatives, transparencies, stereoscopic prints and slides; lantern slides, and general work.
>
> Exhibits may be excluded unless the points of special technical or scientific interest are distinctly stated.
>
> Medals will be placed at the disposal of the judges, but noncompetitive work will be admitted.

There seems to be a small charge to each exhibitor for the wall space occupied by him.

A NEW METEOROLOGICAL JOURNAL.

By a letter from Mr. A. J. Monné, of Nykerk, we learn that with the cooperation of Mr. Chr. A. C. Nell he proposes to publish a journal for meteorology in the Dutch language. The meteorology of the ocean has, as is well known, been diligently studied by the Dutch navigators, and forms the principal part of the work of the meteorological institute of the Netherlands, founded by Buys-Ballot, and now conducted by Prof. Dr. M. Snellen of the University of Utrecht. Moreover, the islands of the Dutch West Indies and East Indies are so near to the West Indies and Philippines, respectively, that our interest in their meteorology has lately become greatly quickened. We doubt not that the Dutch journal will have much interest for many American readers.

CLIMATIC DIVISIONS OF MISSOURI.

In the annual summary of the Missouri section, for 1899, Mr. A. E. Hackett, Section Director, adds a general review of the climate of Missouri. He divides the State into five physiographic divisions, and attributes to each of them the following normal temperatures and rainfall for the respective seasons:

Divisions.	Normal mean temperatures.				Normal average precipitation.			
	Spring.	Summer.	Autumn.	Winter.	Spring.	Summer.	Autumn.	Winter.
	°	°	°	°	*Ins.*	*Ins.*	*Ins.*	*Ins.*
Northwest plateau	51.8	74.5	53.6	27.7	10.74	13.62	7.32	4.65
Northeast plain	53.5	75.3	55.1	30.6	11.58	11.87	8.45	6.51
Southwest lowlands	54.3	75.7	56.1	31.9	12.44	12.50	7.79	6.42
Ozark plateau	55.1	74.8	56.2	34.7	14.00	12.75	8.89	8.09
Southeast lowlands	58.0	76.7	58.3	37.3	14.52	11.36	9.90	10.57
State	54.5	75.3	55.9	32.4	12.65	12.44	8.47	7.25

THE EFFECTS OF DIMINISHED PRESSURE ON COOKING.

In the January report of the New Mexico section Mr. R. M. Hardinge quotes the following from a cook book issued by the ladies' guild at Albuquerque, N. Mex. The whole article seems to give results of actual experience and careful observation on a subject which is now attracting great attention at the hands of experimental stations that are doing for the kitchen that which has already been done for the farms and the workshops. Some of the hypothetical explanations given by Mrs. C. L. Herrick, to whom this article is due, may not stand the test of further scientific investigation, but the whole subject is eminently worthy the attention of the chemists.

It is a matter of common observation among housekeepers in New Mexico that recipes and practices found reliable elsewhere fail to achieve the expected results on the Plateau.

Some of us have endured many trying experiences in adapting our cooking to our environment, and it is to aid friends to a more easy accomplishment of these household tasks that these lines are written.

One of the difficulties has been with our cake mixing and baking. It took me a long time to discover that the use of the same number of eggs I had been accustomed to in a lower altitude caused my cakes to be a failure. I now use half as many as my eastern recipes call for, adding two tablespoons of milk or water for each egg left out. The reason for this is that the albumen of the egg, when added to the batter, forms a tenacious coating, which helps it to retain the gases that tend to escape by virtue of their expansion. The albumen is much heavier than the gases engendered by the raising agent, and when the atmospheric pressure is heavier, as in lower altitudes, it is impossible for these gases to escape so rapidly, and there is time for the batter to be thoroughly aerated before hardening.

Here the heat of our ovens is longer in penetrating, the atmospheric pressure is diminished, and the gases tend to escape before the heat is sufficient to harden. This escape of the gases prevents the aeration of so large a quantity of the albumen, and the superfluous amount serves but to toughen the cake. It is necessary to apply the heat quickly and evenly in order to coagulate the albumen and prevent the collapse or "falling" of the cake.

Less shortening and less sugar can be used here, because of their weight and, also, because both melt in the process of baking, and in this way dilute the batter and make it easier for the gases to escape. To counteract this, more flour must be used, the proteids of which form a glutinous consistency which prevents the escape of the gases.

It has been found more satisfactory to add the raising agent after all other mixing is done and just as the batter is ready to place in pans for the oven. This prevents the escape of the gases before reaching the oven, which is sure to occur if the raising agent is sifted through the flour and added gradually, as we were accustomed to mix ingredients in a lower altitude, for effervescence begins as soon as the raising agent is moistened.

I have been much more successful in using one teaspoonful of soda with two teaspoons of cream of tartar as a raising agent when a teaspoon of baking powder is called for, without, however, being able to determine the reason.

We are all familiar with the varying temperature of boiling water

according to altitude, and know that it is not possible for water to get hot enough to cook an egg on the summit of a high mountain. In fact, this temperature of boiling water is a helpful guide in determining elevations of mountains, and is often so used. This helps us to understand why it is that articles of food whose cooking depends upon heat applied through the medium of water requires a longer time for cooking in Albuquerque, where the temperature of boiling water is 202° F., than the same food would require at sea level, where the temperature of boiling water is 212° F. The vapor of water contained in cooking food will also afford heat more slowly.

The extreme dryness of the atmosphere of the Plateau has a marked hardening influence upon many food substances, so that our farinaceous foods, such as beans, corn, etc., require to be left much longer in water before cooking in order that they may be softened.

We believe that the Weather Bureau observers on Pikes Peak were never able to boil their dried beans so as to make them palatable. As regards the action of baking soda and of egg batter, it may be that the barometric pressure or the elastic resistance of the air (not its weight) determines to what extent the disengaged carbonic acid gas shall expand and aerate the dough.

SUDDEN TEMPERATURE CHANGES IN MONTANA.

In the MONTHLY WEATHER REVIEW for March, we give on page 115 the remarks of Mr. C. W. Ling concerning the sudden changes of temperature on March 7 and 8, at Havre, Mont., followed by some remarks by the Editor. Further contributions on this subject have been received from which we quote as follows.

In the March report of the Montana section, Mr. E. J. Glass, gives the following quotation from the records of the observer at Kipp:

An interesting meteorological phenomenon was observed here at 10:25 a. m., March 8. A strong chinook wind was blowing from the southwest, temperature, 40°. For an hour previous a characteristic cold wave cloud had been visible in the north, drifting rapidly eastward, and at the same time spreading slowly toward the south. Suddenly a huge mass of white fog-like cloud appeared in the southeast, moving at a low altitude in a northwesterly direction with great rapidity. At 10:50 a. m., when the latter covered about one-third of the sky, the wind veered to north, and the meeting of the three currents of air, one warm and moist, the second a typical dry chinook, and the third frigid in the extreme, caused an instantaneous precipitation of frost, amounting to 0.5 of an inch, and a fall in temperature from 40° to 9° in less than two minutes, while the sun was shining brightly. At 2:15 p. m. the wind had backed to southwest and the temperature had risen to 39°. Chinook winds at Ovando and Yale. Ice in creeks broken up in the vicinity of Wibaux. Farmers in western Montana are seeding. Plowing is being done over the State where the ground is free from snow.

By comparing the above record with the observations at Havre, Mont., and those at Helena, which are respectively 150 miles east and southeast, the Editor is led to believe that it should be possible, with the assistance of our voluntary observers, to elaborate a complete system by which to foresee the approach of cold waves and chinooks, or any other sudden changes of temperature within 200 miles of the main Divide of the Rocky Mountains. Such a system can apparently derive but little help from observations on the high plateau west of the main Divide, including the western portion of Montana and the whole of Idaho, until we have solved the problem of reducing pressures at elevated stations to a common upper level.

In continuation of this subject Mr. C. W. Ling again writes from Havre under date of May 14, as follows:

In regard to the sudden changes of temperature on March 7 and 8, and other similar changes in temperature that occur here, I beg to state that I believe they are due entirely to the conditions assumed by the atmospheric pressure, two lows or two low pressure areas of different energy and both bounded on the north by the same high would cause these alternate currents of warm and cold air. Any low moving eastward and causing an indraught of air from the Plateau region southwest of Havre produces dynamic heating, giving Havre a sudden rise in temperature and southwest winds.

No foehn process occurs here with a south or southeast wind. The second low moving eastward allows the influence of the high to be felt, in which the temperature falls suddenly. If the movement of the lows is slow, the alternating changes in temperature caused by the chinook and cold wave conditions will occur in this vicinity.

The accumulation of cold air in valleys or lowlands that is felt often in driving over a hilly country, especially on a still night, no wind prevailing, could hardly be applied as the cause of the sudden changes in temperature in this neighborhood even if this cold air was put in motion, for the changes occur here when a fresh to brisk wind prevails.

As a further contribution to this study Prof. A. J. Henry submits the accompanying copies of the continuous barograph and thermograph records at Havre, fig. 3, and at Williston, fig. 4, and says:

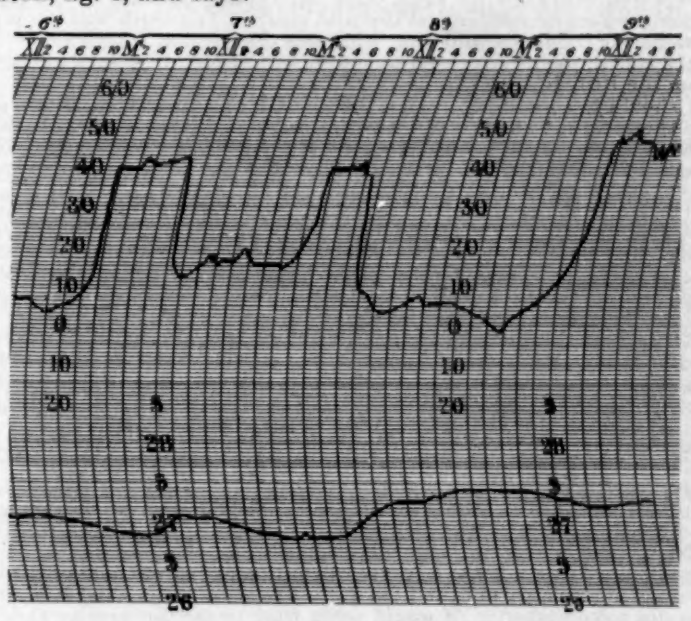


FIG. 3.—HAVRE.

The sequence of events was about as follows: On the night of March 6 a low area was approaching Montana from the north Pacific coast. At the p. m. observation Havre and other stations to the northward and northeastward were well within the region of northeasterly winds. In the southwestern and southern portions of Montana the winds were from a southerly quarter. The dividing line between the opposing wind systems must have extended diagonally across the State in a northwesterly-southeasterly direction.

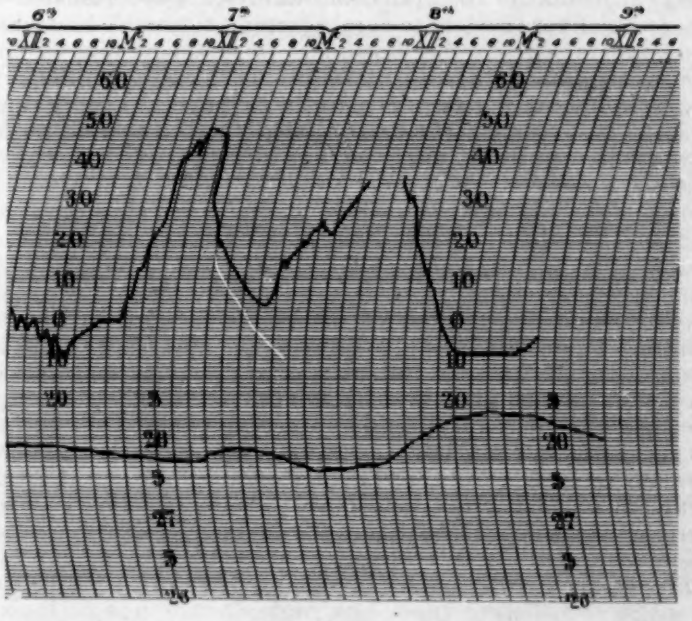


FIG. 4.—WILLISTON.

At Havre the temperature began to rise slowly at 10 p. m. of the 6th,

and continued to rise slowly with wind steady from the northeast. The wind continued from that direction until 3:25 a. m. of the 7th, when it suddenly shifted to the southwest with increasing velocity and a sudden rise in temperature, as shown on the thermograph trace, fig. 3.

The important point to note in this connection is the fact that temperature rose 7° from 10 p. m. of the 6th to 3:25 a. m. of the 7th with a wind blowing toward mountain slopes to the westward of the station.

Southwesterly winds and high temperatures prevailed until about 12:30 p. m. of the same day (7th) when the wind shifted to a northerly quarter with a cold wave.

We may now consider that one of two things happened. First, a considerable body of warm dry air may have become detached from the parent low, which still lay to the westward of the Rocky Mountains, and moved eastward in the general circulation. In this event the irruption of cold air from the north was merely a return to the conditions which had prevailed for some days before the approach of the low. Second, we may consider that the cold air from the north was the predominating influence, and that what was observed at Havre and Williston was the southern extension of a high area moving southeasterly from the British possession.

I should have said before that the first fall in temperature, shown on the thermograph sheet, was not accompanied by strong winds. In fact there was very little wind during the twelve hours that elapsed between the advent of the first cold wave and the return of the warm wave on the morning of the 8th.

The rise in temperature, last mentioned, occurred in connection with the advance of the original low, which had meanwhile reached Havre the second time. It advanced thence eastward and was followed by a cold wave, as shown by the thermograph sheets. The whole process, both at Havre and Williston, is beautifully shown by the instrumental tracings in figs. 3 and 4.

The essential difference between the temperature curves at Havre and Williston is in their steepness or slope. The aid of dynamic heating has been invoked to account for the sharp incline of the Havre curve with rising temperature. I wish to point out that the falls of temperature at this station are about as sharp as the rises.

Is it not largely a topographic rather than a dynamic effect in both cases?

The particular qualities which differentiate temperature changes at Havre from those of other regions are the suddenness of the change and the amplitude of the oscillation. It would seem as if a wall of warm or cold air, as the case may be, is transported bodily past the station much as a norther advances over the plains of Oklahoma and Texas. While a part of the heat of the so-called foehn wind is doubtless due to compression, it would seem that by far the greater part is due to the original temperature of the air before crossing the main divide of the Rocky Mountains.

WEATHER FORECAST CARDS BY RURAL DELIVERY.

In the report of the Ohio section for March Mr. J. Warren Smith, Section Director, advocates the possibility of distributing daily weather forecast cards by the system of free delivery mail matter in rural communities. The extension of the free delivery system to rural communities was undertaken some years ago by the Postoffice Department and is now recognized as of great benefit from a social, educational, and industrial point of view. Mr. Smith proposes to supply those farmers who request the daily weather forecast with postal cards delivered by the mail carriers whenever the latter start on their routes at the proper time. He finds that of the 49 rural routes in Ohio, the average number of families served is 100. About four-fifths of the carriers leave the postoffice before 10 a. m. In some cases the routes are so long that the carriers must start by 7 a. m., and are all day on the road, but at the greater number of places the carriers leave about 9 a. m. In order to test the value of the plan of Mr. J. Warren Smith, the Chief of Bureau has authorized the forecasts to be telegraphed at Government expense to all the postoffices in Ohio where the rural carriers start later than 10 a. m. As to the districts where the carriers start too early for this service it is recommended that farmers' clubs and institutes take into consideration the possibility of making better postal arrangements in order to secure the advantages of this service.

ICE AND NAVIGATION AT ST. MICHAEL, ALASKA.

Bulletin No. 40, by Lieut. D. H. Jarvis of the United States Revenue Cutter Service, contains additional notes for the Alaska Coast Pilot by the United States Coast and Geodetic Survey. It gives a table deduced from the records of the Alaska Commercial Company, showing the date when the ice first moved out of St. Michael Bay; the first arrival from the Yukon River; the first arrival from the sea; the close of navigation, as determined by the first formation of ice in St. Michael Bay. The location of St. Michael is about latitude 63° 5′ north and longitude 162° west. It is on the southeast shore of Norton Sound, about 100 miles from the mouth of the Yukon and a little more from Cape Nome. The Coast Pilot says:

> The harbor of St. Michael, Norton Sound, is open to navigation, on an average, by the middle of June, the time of breaking up of the ice varying from about the last week of May to the last week June. The season of navigation usually closes in the latter part of October.
>
> The winds in summer are generally moderate; but during September and October gales are strong and frequent, northerly winds predominating. These strong winds are of special importance to mariners on account of their effect on the height of the water; northerly and easterly winds lower the water and southerly and westerly winds raise it. With northerly winds of long duration the amount of change may be as much as 5 feet below mean low water.

The table above referred to is as follows:

Ice conditions at St. Michael, Alaska.

Year.	Ice moving out of St. Michael Bay.	First arrival from Yukon River.	First arrival from sea.	Ice forming in St. Michael Bay.
1878	.....	.....	July 1	Oct. 18-22.
1879	.....	.....	June 22	Oct. 21-25.
1880	June 22	.....	June 28	Oct. 20-27.
1881	June 10	.....	June 19	Nov. 7.
1882	June 8	June 17	June 24	Oct. 23.
1883	June 1	June 10	June 22	Nov. 6.
1884	June 10	June 17	.....	Oct. 6.
1885	.....	.....	June 24	
1886	June 11	.....	June 20	Oct. 22.
1887	.....	June 15	June 20	Oct. 29-Nov. 6.
1888	May 31	June 8	June 25	Oct. 22-31.
1889	June 9	June 13	July 4	Nov. 10-16.
1890	June 3	June 6	July 13	Oct. 25-Nov. 9.
1891	June 6	June 7	June 29	Nov. 6.
1892	June 11	June 7	June 18	Oct. 29.
1893	June 10	June 14	June 24	Nov. 7.
1894	June 15	June 18	June 25	Oct. 26.
1895	June 18	June 19	June 29	Oct. 24-Nov. 4.
1896	June 25	June 27	July 7	Nov. 2.
1897	June 14	June 22	June 26	Oct. 18-21.
1898	June 13	.....	June 13	Oct. 20-31.
1899	June 10	June 16	June 17	

The above table of ice conditions presents us with one of those general climatological characteristics that should apparently give us a sort of summary of the climatic conditions of each season. It is said that the rains on the coasts of California and Oregon have some connection with atmospheric conditions over Alaska. The preceding table may, therefore, furnish a basis for studies in this direction.

The last few pages of this same Coast Survey bulletin are devoted to the Arctic Ocean north of Alaska. Our knowledge of the meteorology of this region is so slight that every scrap of information is of value. The perusal of these pages by Lieutenant Jarvis suggests that this region is not so liable to severe cyclonic storms as it is to severe winds of the straight line type. The immense field of pack ice, whose border is rarely more than 20 miles north of the coast, drifts to and fro, obedient to the general resultant of the winds that prevail over an indefinite region northward, eastward, and westward. This drift of the pack differs, however, from that which would occur if the ocean beneath it were of great depth; the shallow water is driven by it in confused currents hither and thither and acts like a buffer, retarding the ice, but is itself also forced outward in all directions. Therefore vessels drift to and fro with the greatest irregularity, while the foot of the pack merely moves north or south. In general the great ice

floe that covers the Arctic Ocean from America to Siberia appears to circulate about the pole with the winds and currents, moving eastward and northward on the Siberian side but eastward and southward on the American side.

OREGON WEATHER AND BERING SEA ICE.

In the March report of the Oregon section Mr. E. A. Beals, Section Director, quotes from a recent pamphlet by Mr. James Page, meteorologist to the United States, Hydrographic Office, On Ice and Ice Movements in Bering Sea in the Spring Months, as follows:

The pack ice annually moves, roughly speaking, as far south as latitude 58° N. and retreats in the summer to about 71° N., and it is natural to suppose that the movements of this large body of ice would have some influence on the climate of Oregon and Washington. By taking the two early years of 1890 and 1897 it is found that the May temperatures in Portland averaged 4° daily above the normal in the one case, and 2° daily above the normal in the other, and in both the rainfall was decidedly deficient.

The May rainfall has been deficient in years when the ice retreated northward more slowly, but in none of the ten years' record under consideration did the temperature exceed the normal with a slow northward movement, except in 1891, and then the excess was less than half a degree for each day.

The steamer *City of Seattle*, which arrived from Alaska March 31, brings the news that the ice in the Upper Yukon shows signs of breaking up, and that possibly the river will be navigable this spring six weeks earlier than usual.

It may be that the signs of an early spring on the Yukon also imply an early retreat of the pack ice in Bering Sea, and it will be interesting to note how (if this should be the case) the May temperatures in Oregon and Washington will respond for the third time to such conditions.

Vessel and year.	Entered into ice.	Emerged from ice.	Interval in ice.	Average date.	Portland, Oreg., for May. Rain.	Portland, Oreg., for May. Temperature.
1890.	Day.	Day.	Days.	Day.	Inches.	°
Steamship Orca	100	137	37	118.5		
Steamship Balaena	106	134	28	125.0		
Steamship Narwhal	111	122	11	116.5		
Steamship Grampus	123	135	12	129.0		
				122.2	1.08	60.6
1891.						
Steamship Balaena	103	155	52	129.0		
Steamship Orca	104	150	46	127.0		
Steamship Narwhal	112	155	43	138.5		
				131.5	1.83	59.9
1892.						
Steamship Orca	107	157	50	132.0		
Steamship Narwhal	108	140	32	124.0		
Steamship Beluga	109	143	34	126.0		
Steamship Grampus	123	141	18	132.0		
				131.0	0.80	59.0
1893.						
Steamship Orca	106	149	43	127.5		
Steamship Beluga	110	154	44	132.0		
Steamship Thrasher	118	154	36	136.0		
Bark John Winthrop	124	163	39	143.5		
				134.8	2.30	54.4
1894.						
Steamship Orca	103	144	41	123.5		
Steamship Thrasher	103	134	31	118.5		
Bark Wanderer	105	162	57	133.5		
Bark John Winthrop	110	147	37	128.5		
Steamship Beluga	112	149	37	130.5		
				126.9	1.09	55.5
1895.						
Steamship Orca	112	153	41	132.0		
Steamship Balaena	121	148	27	134.0		
Steamship Narwhal	122	146	23	134.0		
Steamship Grampus	129	152	23	140.0		
				135.0	3.42	55.9
1896.						
Steamship Narwhal	93	140	47	116.0		
Steamship Orca	105	146	41	125.0		
				120.5	3.55	52.2
1897.						
Steamship Thrasher	96	128	32	112.0		
Steamship Jeannette	101	133	32	117.0		
Steamship Narwhal	108	139	31	124.0		
Steamship Balaena	113	140	27	126.0		
				119.8	0.90	61.4
1898.						
Steamship Jeannette	110	136	26	123.0		
				123.0	1.78	56.6
1899.						
Steamship Bowhead	109	140	31	124.0		
Steamship Wm. Bayless	100	135	35	118.0		
				121.0	3.16	51.1

On referring to Mr. Page's pamphlet the reader will find a chart of Bering Sea, showing the southern limits of the ice field, on the average of ten years' of experience and observation, between April 15 and May 15. It appears that the southern edge of the ice will in normal seasons connect the Asiatic Continent at latitude 61°, and the American Continent at latitude 59° along an irregular line whose southern limit is, however, not an altogether safe index to the general character of the preceding winter. The early entrance of a vessel into this ice field by no means assures its early emergence from it. On the route northward the length of time spent in the ice pack and the average date between the entrance and emergence off Indian Point may give us a crude idea as tothe importance of the ice and its meteorological significance. The dates are expressed in days, counting from January 1.

If we compare the above figures showing the dates at which it was possible to navigate through the ice, we see a steady retardation of dates from 1890 to 1895, and increase of interval. If we accept these figures as in any way indicating the general character of the ice covering Behring Sea we may make this data the basis for comparing the temperatures at Portland, Oreg., with the condition of the ice. We have, therefore, in the above table added the temperatures and rainfall for May at Portland, thereby reproducing the data that Mr. Beals probably had at hand in writing his paragraph as quoted above. An early passage through the ice implies a rapid movement of the ice northward; therefore early dates in our fifth column should correspond with warm weather, and warm water and southerly winds in Bering Sea south of the ice pack. But the above table does not clearly show that early dates also correspond with warm weather or deficient rainfall in the subsequent month of May at Portland, except for the two years 1890 and 1897.

The whole series may be arranged in order of dates as follows:

Year.	Average date.	Temperature.	Rain.	Year.	Average date.	Temperature.	Rain.
1897	119.8	61.4	0.90	1894	126.9	55.5	1.09
1896	120.5	52.2	3.55	1892	131.0	59.0	0.80
1899	121.0	51.1	3.16	1891	131.5	59.9	1.83
1890	122.2	60.6	1.08	1893	134.8	54.4	2.30
1898	123.0	56.6	1.78	1895	135.0	55.5	3.42
Average	121.3	56.4	2.09	Average	131.5	57.1	1.89

THE BROOKLYN MUSEUM OF METEOROLOGY.

The Brooklyn Institute of Arts and Sciences has taken a leading position in the art of public instruction. There are in that city 200,000 children of whom about 90,000 do not go to school, and yet all are provided for in some way or other by the museums and lectures of the Institute at No. 185 Brooklyn avenue.

It is the purpose of the childrens' museum to build up gradually for the children and young people of Brooklyn and Queens County, a museum that will delight and instruct the children who visit it; to bring together collections in every branch of local natural history that is calculated to interest children and to stimulate their powers of observation and reflection; to illustrate by collections of pictures, cartoons, charts, models, maps, and so on, each of the important branches of knowledge which is taught in the elementary schools.

At the present time the collections exhibited in the museum illustrate many branches of industry, such as the iron production and manufacture, and many branches of science such as botany, zoology, geology, physiology and many other branches of knowledge, such as human anatomy, geography,

and history, the evolution of the steam engine, anthropology, and the physical sciences. We are especially interested in the collections illustrating meteorology.

All the chief instruments employed in Government meteorological work have for some time past been installed and steadily recording atmospheric phenomena. These comprehend the following instruments: barographs, thermographs of two forms—Draper's and Richard's, solar radiation thermometers, psychrometers, wind electrical registration apparatus, the anemometer employed being the Robinson form, aneroid barometers, charts, maps, and rain measuring apparatus. There will also be installed electrical rain and snow recording apparatus, electrical sunshine recorder, and additional psychrometers. Samples of the instrumental charts are shown, as well as the complete series of publications which are based on these instruments. Since each instrument has a special explanatory label stating the kind of work which it is doing, the collection should be very useful to teachers and visiting classes.

In addition to these collections, courses of lectures are provided, and the second course in the series, which was inaugurated in April, embraced meteorology and was illustrated by practical illustrations with apparatus.

These lectures were entitled "A course of Instruction in Elementary Meteorology," and were delivered by Prof. Richard E. Call on eight successive Friday afternoons at 4 o'clock, beginning with April 20, and supplemented by two Saturday excursions, on which occasions the observing stations in the vicinity of New York City were inspected. The lectures were intended especially for teachers, but only forty could be admitted on account of the limited capacity of the room. The courses were free, but every one who registered must agree to attend the whole course. The titles of the lectures were as follows:

I. April 20. The Elementary Principles of Physics involved in Meteorology.

II. April 27. The Atmosphere and its Circulation.

III. May 4. Atmospheric Temperatures, their Measurement and Distribution.

IV. May 11. The Barometer; its Theory and its Use.

V. May 18. The Moisture of the Atmosphere.

VI. May 25. The Causes and Distribution of Rainfall.

VII. Weather and Climate.

VIII. June 8. Optical and Electrical Phenomena of the Atmosphere.

LECTURES ON METEOROLOGY.

Mr. Charles E. Linney, Section Director, Springfield, Ill., addressed the Kane County Farmers' Institute at Geneva on February 6, and also the Congregational Club at Springfield on February 13. He exhibited the thermometer, barometer, anemometer, rain gage, and also maps and charts. The lectures were followed by questions from the audience and replies by Mr. Linney, and in both cases were so well received that he has been requested to repeat them.

Mr. C. W. Ling, Observer, Havre, Mont. delivered an excellent lecture to the pupils of the grammar school at Havre, on January 17. This was in connection with the regular course on geography, and served to broaden the ideas of the pupils as to the comprehensiveness of that term. One can not study the divisions of the earth into land and water without asking how it all came about. We find that the atmosphere with its winds and rains has taken a most prominent part in the formation of the continents, with their mountains and valleys, so that not merely animal and vegetable life, but even the land itself and the ocean, depend upon the atmosphere. Mr. Ling's lecture was largely occupied with a description of the daily map and the official work of the Bureau.

Mr. P. Connor, Local Forecast Official at Kansas City, Mo., writes as follows:

It may be a surprise for eastern schools and eastern readers to hear that one of the high schools of Kansas City, Mo., has adopted meteorology in its curriculum, as one of the elective studies of the school, to be pursued systematically the same as botany or geology, German or Latin.

It is with pardonable pride that I allude to this, for I have been here so long that I am identified with the city's interests. I may also add that it is proof that meteorology has not been a dead issue in this community. I think that the Weather Bureau should feel a genuine interest in having the stamp of popularity thus placed upon this branch of science.

Mr. Porter Graves has the chair of meteorology, and he is entitled to much credit for having advocated its adoption. He started with a class of twenty-five last winter, but expects a much larger class, if not two classes, next year. Observations are taken at noon, daily, of barometer, dry and wet thermometers, clouds, etc. Six weather maps have been furnished daily for study. The class has visited this office to learn the practical working of all the instruments, and in many other ways we have cooperated with Mr. Graves to make his work a success.

On March 16 the Editor had the privilege of an hour's talk with the teachers of Baltimore, Md., on popular methods of presenting meteorology to the lower grades in the public schools. He dwelt on the simplicity of children's thoughts, the honesty and directness of their questions. Every question that a child asks is legitimate and demands an honest, satisfactory, and truthful reply. The study of nature is instinctively the child's daily work; he needs no stimulus, but neither should he be repressed. The teacher should encourage him to collect leaves, stones, shells, bugs, it matters not what; teach him to observe most carefully by seeing, feeling, and listening, The child observes and thinks: the teacher is to supply him with the appropriate words from that encyclopedia of all knowledge, the English dictionary. The teacher should also help him to reason correctly, for that, strange to say, is an art that does not come by intuition, but only by experience guided by observation and experiment. Agassiz educated naturalists by giving them a mass of material and asking them to tell him what they saw and what conclusions they could draw. It is not our business to fill the mind with other people's ideas but to make the child's mind develop such ideas as the better judgment of the teacher recognizes as appropriate and true. Meteorology is first to be studied by observation and record; we begin by recording general impressions but gradually develop greater exactness by the help of instruments. A class of children may keep a regular record in common, as a class, or still better, individually, as persons, showing the wind, temperature, cloudiness, weather, and other details at 8 a. m. every morning. In reasoning upon these items the child begins to think of temperature, moisture, and pressure as the ultimate causes, and may then begin to observe and understand the thermometer, barometer and hygrometer. There is nothing scientific that man has learned from nature but what may be made comprehensible to the child. No matter how great the difficulties experienced by the scientist in getting at the facts and laws of nature, yet, when once attained, they seem to be so elegant and natural that the child can easily learn them. It is unnecessary and wrong to answer a child's inquisitiveness by saying that so-and-so is too difficult. It may be difficult for the teacher to explain it, but it is not too difficult to comprehend when once it is properly explained. It is much more proper for the teacher to say I do not know or I can not explain, than to say the thing is too difficult for you. All the scientific

knowledge of the present day must be put into simple form for the use of the children of the next generation, in order that they may have time to acquire the higher or advanced knowledge that will have to be taught fifty years hence; just as we now teach in the high school that which was appropriate for the university in the days of Galileo and Newton.

METEOROLOGY IN THE UNIVERSITIES.

For many years Prof. William H. Brewer, of Yale College, has delivered courses of lectures on meteorology in the Sheffield Scientific School. The third edition of the syllabus of lectures was published in December, 1896; a fourth edition dated September, 1899, has lately been received. In this edition 13 lectures are enumerated, covering 190 topics, whereas in the third edition, 15 lectures and 206 topics were given. Some of these topics are merely referred to in the lectures, but are introduced in logical order as suggestions to those students who wish to pursue the subject farther. The titles of the 13 lectures are as follows:

I. Introduction.
II. The Atmosphere.
III. Temperature.
IV. Pressure.
V. Winds and Circulation.
VI. Atmospheric Moisture.
VII. Condensation of Atmospheric Moisture.
VIII. Cyclones and Anticyclones.
IX. Other Storms and Winds.
X. Rainfall and its Distribution.
XI. Public Weather Service.
XII. Atmospheric Electricity.
XIII. Optical Meteorology.

Since the establishment of the school of forestry at Yale College, Professor Brewer's lectures to the students of forestry have included, not merely the above course in meteorology, but also additional lectures on the relations of forestry and meteorology, including the following special subjects:

General conditions necessary to forests; elementary meteorology; forests as related to temperature and its range; to rainfall and its range; to excesses of weather and climate; to the mechanical and chemical nature of soil and groundwater; to the geological character of the surface; to the relief forms of the land; to other geographical features; the geographical distribution of forests; the aspects of forests as related to climate and topography; and the geological history of forests.

THE WEATHER BUREAU AND THE UNIVERSITIES.

It is difficult to fully record or realize the activity of the Weather Bureau officials in the matter of lectures on meteorology and cognate subjects. We are especially interested in lectures of a highly instructive character delivered to the students in colleges and universities and if the Editor sometimes fails to mention these in the MONTHLY WEATHER REVIEW, he hopes that the respective lecturers will promptly send him a memorandum for publication.

Several lectures have been delivered from time to time by Mr. Charles Stewart of Spokane, Wash.; the last in his series was that delivered on February 24 for the faculty and students at Gonzaga College. The address was illustrated by means of four large charts prepared by Mr. Stewart, who spoke upon the utility of scientific weather observations. Before concluding, Mr Stewart gave replies to questions put by his hearers, whose appreciation was evinced by hearty applause.

A course of five lectures on advanced meteorology was delivered before the students in mathematical physics, at the Johns Hopkins University, May 7–11, 1900, by Prof. F. H. Bigelow of the United States Weather Bureau, on the following topics:

1. A new method of deducing the general equations of motion on the rotating earth.
2. The treatment of the aqueous vapor in barometric and thermodynamic problems.
3. Application of this discussion to the theory of the formation of clouds.
4. The Ferrel and the German types of circulation in the general and the local cyclones.
5. The results of the international cloud observations in the United States, and their indications regarding the circulation of the atmosphere.

The series of lectures on meteorology delivered by Dr. O. L. Fassig, at the Johns Hopkins University, by permission of the Chief of the Weather Bureau, came to a close on March 17, and we make the following extracts from his report on the subject:

The character of the series was somewhat changed this year. In place of the regular University lectures to a small number of students, the series was placed in the public educational course inaugurated by the University last year. This made it necessary to put the lectures into more popular form; at the same time the size of the class was greatly increased. Last year the class consisted of 7 or 8 University students; this year it comprised about 80 public school teachers and principals and 5 University students. The regular course consisted of 15 class lectures, covering the general subject of meteorology and climatology and the work of the United States Weather Bureau. A supplementary course of 6 lectures was added; in this course I had the generous cooperation of Professor Abbe and of Mr. Walz of the Weather Bureau and of Mr. Page of the United States Hydrographic Office.

The period covered by the courses was from January 6 to March 17, 1900, 2 lectures being given each week. Attendance was free to University students and to members of the local office of the Weather Bureau. From others of the class a subscription of $3 was required for the course. An additional fee of $2 was required of those receiving a certificate at the close of a successful written examination.[1]

The scope of topics treated may be seen from an inspection of the lecture outlines and illustrative diagrams submitted herewith. A detailed outline of each lecture was printed and given to members of the class. In addition to the printed outlines the chalk plate process was freely used in preparing diagrams to illustrate principles and conditions. The diagrams have given much satisfaction to members of the class, and have added greatly to a better understanding of the subjects treated. Judging from comments made by President Gilman, Dr. Clark, and members of the class, I infer that the course of lectures has given satisfaction.

The members of the class have shown much interest in the subject of meteorology and in the work of the Weather Bureau; it was a source of much encouragement to me to find this interest maintained to the end of the course.

I have from time to time received requests from other members of the Bureau for copies of my lecture notes. Having spent much time and labor in the preparation of my outlines and diagrams, in addition to my notes, and thinking that they may be of some value to my colleagues, I have collected together a few sets like the pamphlet submitted herewith, and have sent them to those Weather Bureau officials who are engaged in similar work at other universities.

THE CLIMATOLOGY OF CALIFORNIA.

The reports of the California section are rich in valuable climatological data, thus: The number for April contains an article on the climate of Salinas, presumably by Mr. McAdie. The March number contains the summary, by Dr. A. K. Johnson, voluntary observer at that place, on the climatology of San Bernardino. The February number contains one on the climatology of Fresno by Mr. J. P. Bolton, observer, Weather Bureau, at that place. The January number has an article on the climate of Los Angeles by Mr. G. E. Franklin, local forecast official. Doubtless this excellent series will be con-

[1] These fees belong to the University.—C. A.

tinued by similar contributions from other parts of the State, and Mr. McAdie is to be congratulated on his success in stimulating the study of climatology throughout the great area over which he has supervision.

ISOTHERMS FOR A GIVEN ALTITUDE.

In drawing isothermal lines one's desire must be to present the temperature of the air so clearly that the reader may, at a glance, obtain a graphic and correct impression as to both relative and absolute temperatures. If we go only into the most general features of the distribution of temperature in the atmosphere and neglect the small differences that occur in what are called local climates, or if we consider the air far above the earth's surface as being of greater dynamic importance than that near the ground, then we may be content with isotherms depending upon a few observations at stations several hundred miles apart as in the general Weather Bureau telegraph system. But if we consider local climatology from an agricultural point of view, we must not only make use of an unlimited number of stations in every variety of location, as in our voluntary system, but we must also carefully consider the details of the topography of the ground and the methods of presenting the influence of topography upon temperature. For instance, imagine a valley surrounded by very gentle slopes attaining their summits ten miles away from the central depression; in such a valley, during clear nights, the air will settle into the depression and the minimum temperature at that point will be lower than on the summits ten miles away. If now we draw isotherms for surface temperatures only and display them on charts without showing the topography, the reader will infer that we have here a cold center and a warm circumference, and will expect to see the winds blowing outward in all directions, in a manner exactly contrary to what takes place during clear nights. On the other hand, during the daytime, the temperatures will be hotter in the central depression and cooler on the rim. The isotherms will show this fact and the observed winds will harmonize with the conclusion that the cool wind on the rim should flow toward the rising hot air of the center. The simplest way in which to present the details of temperature at the surface for comparison or study is by means of surface isotherms or temperatures in one color, printed upon a map that shows contour lines in another color.

The flow of water, or drainage, can be inferred from the contour map because the relation between the two is very definite and simple. Water will flow down grade, but the wind flows easily either up hill or down hill, according as the surface of the ground is heated by the sun or cooled by radiation. It is only during still nights that cold air flows down grade with the regularity of a water course.

If we give up all attempts to represent the details of temperature over a large and varied area like that of the United States, and present only the most general aspects of atmospheric temperature, such as the daily, monthly, and annual averages, we can do this in part by taking advantage of the fact that these average temperatures generally diminish with altitude above sea level, not indeed according to a uniform rate, but with rates whose variations, diurnal, annual, and local, are beginning to be at least approximately understood. We shall not go far wrong if we adopt the rule that the monthly mean temperatures at the Weather Bureau station throughout the United States diminish with the altitude of the station above sea level at the rate of 1.5° per 1,000 feet during December, January, and February; 2.0° during March, April, and May; 2.5° during June, July, and August; 2.0° during September, October, and November. This is not to say that the air temperature in the free air above the ground follows this law. On the contrary, the station temperatures are affected by the presence of the earth on which they stand; a plateau or mountain station has not the temperature that would be observed from a balloon in mid air at that altitude. Moreover, the above rates of diminution apply to the average temperature of the month, as affected by average winds and clouds, and may depart very far from the law that obtains during clear weather or calms. Thus it happens that each station has a special local correction.

If we now adopt these or similar mean monthly vertical gradients and reduce the surface means to a uniform level, for which the sea level is generally the most convenient, but a higher level is appropriate to plateaux applying local corrections when needed, we obtain the sea level isotherms shown on Chart IV of the MONTHLY WEATHER REVIEW. Such isotherms must, of course, not be considered as representing surface temperatures nor even the atmospheric temperatures that would prevail if the continent were reduced to a plain at a given level; they give us merely a convenient basis on which we may base a calculation as to what the mean surface temperatures were for any month and at a spot of any given altitude. For instance, the REVIEW for February, 1900, Chart IV gives a sea level temperature of 34° for Wichita, Kans., as computed by using a gradient of 1.5° per 1,000 feet. As the altitude of the Wichita thermometer is about 1,400 feet above sea level, the reduction upward to that level is about 2° and we should expect the mean surface temperature at that elevation to be 32°. Again, Chart IV gives for Cheyenne, Wyo., 30° at sea level. For the altitude of Cheyenne (6,125 feet) the reduction is 9.2°, whence the surface temperatures would be 21°. After this fashion we may now obtain some idea of temperatures for any other portion of the country where no stations are available, provided we know the approximate altitute.

Unsatisfactory as the results may be, this is nevertheless the best that has as yet been done in the way of presenting for general study the average temperature conditions. If we take the other method, plot our observed temperatures on a contour map and draw isotherms that follow the contours quite closely we need a map that must be published on a scale large enough to show the contour lines for every 100 feet, and the location of every station relative thereto. When it comes to the charting of the mean minimum, or mean maximum temperatures, and especially of the individual observed temperatures, we doubt whether any process will be so satisfactory as the simple reproduction of the contour maps with the addition of the actual temperatures charted at the respective stations where one can study them in connection with winds and orography. The study of local climatology, local rains, local storms and winds is and must be most unsatisfactory until detailed topographic maps are at hand.

REQUEST.

It is desired to obtain some copies of the work entitled Professional Papers of the Signal Service, No. 1. Report on the Solar Eclipse of July, 1878; .by Cleveland Abbe. Washington, 1881. 4to. 186 pp. 28 wood cuts. Any one who has a copy to spare should confer with the Editor.

THE WEATHER OF THE MONTH.

By ALFRED J. HENRY, Professor of Meteorology.

The weather for April, 1900, was abnormal in several respects. The precipitation in the Gulf States, on the Plains south of, and including Nebraska, in Colorado, Wyoming, Utah, and Nevada was unusually heavy. Indeed, more rain fell in eastern Colorado in the single month of April than generally falls in twelve months. Much of the precipitation in the mountainous portions of Colorado and Wyoming was in the form of snow, which, however, largely disappeared before the end of the month.

Severe and destructive floods occurred in several of the Gulf States, as recorded elsewhere in this REVIEW. In the Lake region fine weather prevailed for the most part.

The month was free from destructive storms although minor tornadoes occurred in several States. Thunderstorms were more numerous than for the corresponding month in 1899.

Interlake navigation opened on the 18th, and boats reached the head of Lake Superior by the 22d, about a week earlier than last season. At the opening of navigation on Lake Superior there was considerable field ice at both ends of the lake. The fields in the western end had disappeared by the 30th, but broken fields still remained in the eastern portions of the lake at the end of the month. Considerable field ice also remained in the eastern portion of Lake Erie at the close of the month.

PRESSURE.

Monthly mean pressure was highest (30.05) over the Lake region and the North Pacific coast, respectively, and lowest over Arizona, New Mexico, and the southern portions of Utah and Nevada. The pressure was relatively high over the South Atlantic coast, but not so high as in the Lake region. There was a general diminution of pressure, not only on the South Atlantic coast, but also in the West Indies and over the Atlantic, as indicated by the Bermuda report. The persistence of areas of high pressure in the Lake region had an important bearing upon the weather, not only in that locality but elsewhere, especially to the southwest. The heavy precipitation in Texas, eastern Colorado, and elsewhere throughout the southwest was due, in a great measure, to the presence and persistence of areas of high pressure in the Lake region and along the northern boundary west of the ninety-fifth meridian.

The cloudiness within the regions of heavy rains and snows was naturally excessive, while that of the Lake region was comparatively light.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

Temperature was above the normal north of a line extending from the Florida coast to the coasts of Washington and Oregon. In the center of the continent, as at Winnipeg, the average daily excess of temperature above normal was 12°. This amount diminished fairly uniformly to the southward and also to the eastward and westward to both oceans.

The greatest negative departures were recorded in southeastern California and southern Arizona.

It is to be noted in this connection that temperature was markedly above normal in the Lake region where, as we have just seen, the prevailing pressure was also above the normal for the season. We are accustomed to associate the advance of an area of high pressure with a fall in temperature. Evidently a predominance of highs does not necessarily mean a diminution in seasonal temperature averages.

In Canada.—Prof. R. F. Stupart says:

The temperature was above average in all portions of Canada. It was as much as 12° above in Manitoba, and from 4° to 11° in the Northwest Territories. In British Columbia it was in excess of the average from 3° to 6°, in Ontario from 2° to 6°, and in Quebec from 1° to 4°, while in the Maritime Provinces it was from average to 3° above.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	45.3	+ 2.0	+ 2.7	+ 0.7
Middle Atlantic	12	52.0	+ 1.4	− 0.4	− 0.1
South Atlantic	10	62.6	+ 0.6	− 4.6	− 1.2
Florida Peninsula	7	71.0	0.0	− 6.7	− 1.7
East Gulf	7	66.0	− 0.4	− 7.9	− 2.0
West Gulf	7	66.1	− 0.9	− 0.5	− 0.1
Ohio Valley and Tennessee	12	56.3	+ 0.4	− 4.7	− 1.2
Lower Lake	8	46.6	+ 1.9	− 3.7	− 0.9
Upper Lake	9	44.6	+ 4.4	+ 3.3	+ 0.8
North Dakota	8	50.3	+ 8.5	+19.9	+ 5.0
Upper Mississippi Valley	11	54.3	+ 3.1	+ 2.3	+ 0.6
Missouri Valley	10	54.7	+ 3.7	+10.1	+ 2.5
Northern Slope	7	47.6	+ 2.9	+18.4	+ 4.6
Middle Slope	6	53.3	− 0.8	+ 8.0	+ 2.0
Southern Slope	6	58.8	− 2.3	+ 3.6	+ 0.9
Southern Plateau	15	52.0	− 4.1	+ 9.4	+ 2.4
Middle Plateau	9	45.9	− 1.7	+17.1	+ 4.3
Northern Plateau	10	47.8	− 1.4	+17.2	+ 4.3
North Pacific	9	50.1	+ 1.1	+12.9	+ 3.2
Middle Pacific	5	54.7	− 0.7	+ 6.5	+ 1.6
South Pacific	4	56.5	− 2.2	+ 8.1	+ 2.0

PRECIPITATION.

Unusually heavy rains fell in all of the Gulf States, especially in Texas, also throughout the Plains region northward as far as South Dakota and westward to Nevada. The heavy rains in Mississippi, Alabama, Louisiana, and Texas were the cause of destructive floods in those States, an account of which is given elsewhere in this REVIEW.

The most remarkable rainfall was that of eastern Colorado, where 10 inches or more fell at a number of stations. This is the more extraordinary since the normal annual rainfall of that region is barely 10 inches. The highest annual rainfall ever known at Las Animas was nearly 16 inches, while the total fall for April, 1900, was 7.54 inches. The least annual rainfall ever known at the same station was as low as 4 inches, or about half of that for the current month.

The excessive rainfalls were due in a large measure to the fact that several low area storms moved northeastward from western Texas and New Mexico at a very slow rate. One storm in particular advanced less than 400 miles in forty-eight hours, rain and snow, mixed, falling continuously over large portions of Colorado and surrounding States.

Less than the normal amount of rain fell in the Ohio Valley, Middle Atlantic States, the Lake region, and the upper Mississippi and Missouri valleys. The rainfall of the North Pacific coast was likewise considerably below the normal amount. East of the Rocky Mountains the snowfall was very light. In eastern Colorado and also throughout the mountain regions of that State, as well as Wyoming to the northwest, portions of Utah and Nevada to the westward received on an average 10 inches or more of snow during the month.

In Canada.—Professor Stupart says:

The precipitation in the Maritime Provinces was generally above the average, this was especially the case in the eastern part, where at Sydney the excess amounted to 3.8 inches. In all other portions of the Dominion, except in a few isolated localities, the precipitation was below the average. In British Columbia the deficiency at many places was from an inch and a quarter to an inch and a half. At both Winnipeg and Quebec it was an inch and a quarter below the average amount, and in Ontario it varies from a tenth of an inch to a little over an inch. Snow fell heavily in many portions of the Maritime Provinces on several occasions, especially during the last week of the month, but elsewhere in Canada very little snow was recorded and all the snow had disappeared from the ground by the end of the month, except in parts of eastern Quebec and the Maritime Provinces.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	2.55	76	−0.8	+2.1
Middle Atlantic	12	2.36	70	−1.0	−1.7
South Atlantic	10	5.06	146	+1.6	+1.3
Florida Peninsula	7	3.90	170	+1.6	+6.5
East Gulf	7	8.10	184	+3.7	+3.9
West Gulf	7	5.01	131	+1.2	+0.9
Ohio Valley and Tennessee	12	2.67	66	−1.4	−5.1
Lower Lake	8	1.68	71	−0.7	+0.8
Upper Lake	9	1.65	73	−0.6	−1.7
North Dakota	8	0.93	44	−1.2	−1.7
Upper Mississippi Valley	11	2.04	67	−1.0	−1.5
Missouri Valley	10	3.35	110	+0.3	−0.4
Northern Slope	7	3.83	235	+2.2	+1.6
Middle Slope	6	5.10	255	+3.1	+1.9
Southern Slope	6	4.78	219	+2.6	+2.1
Southern Plateau	15	1.70	340	+1.2	−1.0
Middle Plateau	9	1.75	167	+0.7	−1.5
Northern Plateau	10	1.87	136	+0.5	−1.2
North Pacific	9	2.34	52	−2.2	−3.7
Middle Pacific	5	2.52	96	−0.1	−4.4
South Pacific	4	1.00	71	−0.4	−5.4

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 4, 8, 10, 11, 21, 25, 26, 29. Arizona, 2, 4, 5, 6, 7, 9, 10, 14, 15, 16, 17, 23, 25, 26, 27, 28, 29. Arkansas, 10, 13, 15, 26. Colorado, 4, 8, 14, 15, 21, 22, 23, 24, 25, 27, 29. Delaware, 11. Florida, 20. Georgia, 3, 4, 12, 29. Idaho, 3, 7, 12, 14, 15, 21, 22, 25, 26. Illinois, 11, 17. Indiana, 10, 11, 13, 16. Indian Territory, 10, 19, 27. Iowa, 15, 16, 17, 26. Kansas, 2, 3, 4, 9, 15, 16, 17, 19, 22, 24, 25, 26, 28. Kentucky, 10, 21, 26. Louisiana, 10, 11, 12, 15, 16, 17, 22. Maryland, 22, 30. Massachusetts, 24. Michigan, 2, 3, 11. Minnesota, 26, 27. Mississippi, 8, 10, 11, 15, 16, 17. Missouri, 1, 3, 8, 9, 10, 15, 16, 24, 25, 26, 27. Montana, 3, 24. Nebraska, 9, 10, 22, 23, 24, 25, 26, 27, 28. Nevada, 2, 7, 21, 25, 26, 27, 28, 29, 30. New Hampshire, 28. New Mexico, 4, 5, 8, 14, 15, 27, 28. New York, 3, 11, 12, 22. North Carolina, 4, 12, 13, 21, 25, 26. North Dakota, 25, 27. Ohio, 9, 11, 18, 22, 24. Oklahoma, 3, 4, 9, 10, 15, 18, 19, 21, 22, 23, 24, 25, 27. Pennsylvania 12, 22. South Dakota, 23, 24, 25, 26, 27. Tennessee, 3, 11, 25, 26, 27. Texas, 9, 16, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30. Utah, 3, 8, 9, 16, 22, 23, 24, 25, 26, 27, 28. Virginia, 4, 10, 11, 12, 22. Washington, 6, 7, 20, 22, 25. West Virginia, 2. Wyoming, 3, 8, 22, 24, 26, 27, 29, 30.

SLEET.

The following are the dates on which sleet fell in the respective States:

Arkansas, 11. Colorado, 4, 6, 8, 15. Connecticut, 12. District of Columbia, 11. Georgia, 12. Idaho, 2, 8, 26. Illinois, 9, 10, 11. Indiana, 9, 10, 11, 13, 14. Iowa, 11. Kansas, 9, 10, 11. Maine, 24, 26, 27, 28. Maryland, 4, 11, 12. Massachusetts, 12, 24, 28. Michigan, 3, 11, 21. Missouri, 10, 11. Nebraska, 10, 17. Nevada, 7. New Hampshire, 12. New Jersey, 11, 13. New Mexico, 4, 5, 21, 24, 28. New York, 13. Ohio, 2, 9, 10, 11, 22. Oregon, 8, 25, 26. Pennsylvania, 11, 12. Utah, 4, 14, 21, 22, 23, 24, 25, 26, 27, 28, 29. Virginia, 5, 11. Washington, 7, 8. West Virginia, 2. Wisconsin, 11, 13.

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.3	0.0	Missouri Valley	6.0	+0.6
Middle Atlantic	4.9	−0.3	Northern Slope	5.6	+0.2
South Atlantic	4.8	+0.4	Middle Slope	6.0	+1.6
Florida Peninsula	4.6	+0.7	Southern Slope	4.8	+0.6
East Gulf	5.1	+0.6	Southern Plateau	3.2	+0.9
West Gulf	5.8	+0.6	Middle Plateau	6.7	+2.2
Ohio Valley and Tennessee	4.9	−0.4	Northern Plateau	6.3	0.0
Lower Lake	5.0	−0.5	North Pacific Coast	5.6	−0.9
Upper Lake	5.3	−0.4	Middle Pacific Coast	4.3	−0.3
North Dakota	3.8	−1.7	South Pacific Coast	3.9	0.0
Upper Mississippi	5.1	−0.4			

HUMIDITY.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	71	− 1	Missouri Valley	63	− 2
Middle Atlantic	63	− 4	Northern Slope	67	+10
South Atlantic	72	0	Middle Slope	69	+14
Florida Peninsula	78	+ 3	Southern Slope	66	+13
East Gulf	73	+ 1	Southern Plateau	38	+ 8
West Gulf	76	+ 4	Middle Plateau	53	+ 9
Ohio Valley and Tennessee	64	0	Northern Plateau	68	+ 8
Lower Lake	69	− 1	North Pacific Coast	74	− 5
Upper Lake	72	− 2	Middle Pacific Coast	70	− 4
North Dakota	60	− 8	South Pacific Coast	70	+ 1
Upper Mississippi	66	+ 1			

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table VII, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 2,617 thunderstorms were received during the current month as against 1,962 in 1899 and 740 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 22d, 200; 26th and 27th, 172; 25th, 150.

Reports were most numerous from: Kansas, 166; Texas, 163; Nebraska, 147; Louisiana, 146.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, 10th to 18th.

The greatest number of reports were received for the following dates: 30th, 149; 4th and 29th, 3.

Reports were most numerous from: Minnesota, 11; Michigan and South Dakota, 7; North Dakota, 6.

In Canada.—Auroras were reported as follows: Quebec, 4th; Kingston, 30th; Minnedosa, 1st, 4th, 9th, 10th, 28th, 30th; Medicine Hat, 4th and 30th; Prince Albert, 22d, 27th, 30th.

Thunderstorms were reported as follows: Grand Manan, 19th; Charlottetown, 19th; Toronto, 18th; Minnedosa, 26th, 27th; Qu'Appelle, 25th; Banff, 3d; Battleford, 23d, 25th; Hamilton, Bermuda, 5th.

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	4	64	e.	Mount Tamalpais, Cal.	3	56	nw.
Do.	5	58	se.	Do.	6	75	nw.
Do.	10	60	n.	Do.	7	61	nw.
Do.	11	58	n.	Do.	12	60	nw.
Cape Henry, Va.	5	50	n.	Do.	13	59	nw.
Denver, Colo	3	52	se.	Do.	22	71	nw.
El Paso, Tex.	8	50	sw.	Do.	25	52	n.
Do.	14	54	sw.	Do.	27	52	n.
Hatteras, N. C.	4	54	nw.	New York, N. Y.	3	52	w.
Independence, Cal.	2	52	w.	Do.	8	63	w.
Memphis, Tenn.	8	55	e.	Do.	26	52	nw.

CORRIGENDUM.

Mr. I. M. Cline requests that the heading of the table of rainfall, on page 147, be corrected by omitting the words "during flood period" and by changing "April 17 to April 7."

DESCRIPTION OF TABLES AND CHARTS.

By ALFRED J. HENRY, Professor of Meteorology.

For description of tables and charts see page 26 of REVIEW for January, 1900.

TABLE 1.—*Climatological data for Weather Bureau Stations, April, 1900.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.									Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Mean actual, 8 a. m. + 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. + mean min. + 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							45.3	+ 2.0										71	2.55	— 0.8								5.3		
Eastport	76	69	74	29.80	29.89	.00	40.8	+ 2.2	70	21	48	26	1	34	29	37	34	79	2.47	— 0.6	13	8,036	n.	42	e.	3	6	6	18	6.9	1.4
Portland, Me.	103	81	89	29.82	29.92	.00	45.0	+ 2.0	75	30	54	23	10	36	34	39	31	69	2.25	— 0.8	9	6,017	nw.	29	s.	18	15	6	9	4.7	
Northfield	876	15	65	29.03	29.99	+ .03	39.4	+ 0.1	75	21	49	15	5	29	45	35	30	69	1.10	— 1.1	14	6,913	s.	46	sw.	30	9	6	15	6.4	0.3
Boston	125	115	181	29.83	29.97	+ .05	48.6	+ 3.5	81	30	57	27	10	40	31	42	34	61	1.90	— 1.5	11	8,248	nw.	34	nw.	26	13	6	11	5.3	
Nantucket	12	48	54	29.95	29.96	+ .01	45.2	+ 2.1	62	30	50	30	10	40	18	42	39	83	2.61	— 1.0	7	8,046	nw.	33	n.	6	11	8	11	5.6	
Woods Hole	22	11	57	29.94	29.96	+ .02	45.6	+ 2.4	61	30	52	30	10	40	19	41	38	80	2.82	— 1.2	7	9,493	n.	36	sw.	1	12	6	12	5.3	
Vineyard Haven	.....	90	55	.....	.....	.....	47.6	+ 1.2	72	30	55	30	10	40	27	....	....	....	4.64	+ 1.6	6	5,334	sw.	22	sw.	19	8	14	8	5.2	
Block Island	26	11	70	29.98	29.98	+ .03	45.9	+ 2.5	63	26	52	30	10	39	20	41	37	75	2.63	— 0.8	8	11,188	nw.	42	n.	6	12	9	9	4.9	
Narragansett	.....	10	.....	.....	.....	.....	46.1	+ 1.9	69	30	55	24	10	37	32	....	....	....	3.15	— 0.5	6	.....	w.	.....	.....	...	19	3	8	...	
New Haven	106	117	140	29.87	29.99	+ .03	48.4	+ 2.3	76	19	58	25	10	39	35	42	34	61	1.95	— 1.6	6	6,831	n.	29	nw.	1	19	5	6	3.2	
Mid. Atlan. States.							52.0	+ 1.4										63	2.36	— 1.0								4.9		
Albany	97	84	113	29.90	30.01	+ .06	48.0	+ 2.0	77	30	58	26	9	38	34	41	35	65	1.31	— 1.2	8	5,967	w.	36	n.	24	13	7	10	5.0	T.
Binghamton	875	79	90	.....	.....	.....	45.4	— 0.1	77	30	55	22	11	36	36	....	....	....	1.35	— 0.9	8	5,377	nw.	27	n.	27	12	7	11	5.3	0.1
New York	314	108	346	29.66	30.00	+ .03	51.1	+ 3.0	75	30	59	29	10	43	23	43	36	62	2.06	— 1.3	6	11,329	nw.	63	w.	8	10	12	8	5.1	T.
Harrisburg	374	94	104	.....	.....	.....	52.9	+ 2.8	81	30	62	28	11	44	29	....	....	....	1.43	— 2.0	9	5,667	w.	30	w.	23	11	8	11	5.4	T.
Philadelphia	117	168	184	29.90	30.02	+ .04	53.6	+ 3.1	77	30	63	29	11	45	28	46	37	57	1.94	— 1.1	6	8,181	nw.	36	n.	27	9	11	10	5.7	
Atlantic City	32	68	76	29.96	30.02	+ .07	48.8	+ 2.0	72	19	56	26	10	41	26	44	39	72	2.03	— 1.3	8	8,292	nw.	34	n.	6	11	12	7	4.9	
Cape May	17	47	51	30.02	30.04	+ .08	49.8	+ 1.6	70	19	56	29	10	44	23	45	....	....	1.61	— 1.6	6	6,100	nw.	28	ne.	25	15	7	8	4.7	
Baltimore	123	68	82	29.90	30.02	+ .04	55.0	+ 1.9	84	30	64	30	10	46	31	47	40	61	2.06	— 1.4	10	3,574	nw.	20	n.	4	13	7	10	5.1	T.
Washington	112	59	76	29.92	30.05	+ .08	54.2	+ 1.2	82	30	64	30	10	44	32	47	38	57	1.74	— 1.6	9	5,515	nw.	30	nw.	4	16	5	9	4.5	0.2
Cape Henry	.....	5	34	.....	.....	.....	52.4	— 2.2	74	30	60	34	5	45	32	....	....	....	4.57	+ 0.1	9	8,296	s.	50	n.	5	8	11	11	5.7	
Lynchburg	681	83	88	29.28	30.01	+ .03	57.1	+ 1.2	87	30	68	33	5	46	36	48	40	57	3.74	+ 0.4	9	3,526	nw.	33	nw.	6	16	9	5	3.9	
Norfolk	91	102	111	29.94	30.04	+ .06	56.3	+ 0.1	82	30	65	35	5	48	31	50	45	72	4.43	+ 0.4	7	6,771	ne.	38	sw.	30	13	9	8	4.5	
Richmond	144	98	105	.....	.....	.....	57.3	.....	84	30	67	31	5	47	37	....	....	....	3.62	.....	6	4,897	n.	36	nw.	4	15	6	9	4.4	T.
S. Atlantic States.							62.6	+ 0.6										72	5.06	+ 1.6								4.6		
Charlotte	773	68	76	29.20	30.02	+ .04	59.6	— 0.1	83	29	70	30	1	49	33	52	45	63	5.32	+ 1.8	10	4,960	ne.	30	se.	17	8	7	15	6.3	
Hatteras	11	17	36	30.02	30.03	+ .06	58.6	+ 1.4	76	30	64	38	5	53	19	55	52	81	4.84	+ 0.1	8	9,517	ne.	54	nw.	4	14	7	9	5.0	
Kittyhawk	8	12	30	.....	.....	.....	55.4	— 0.4	78	23	62	38	*	48	24	....	....	....	5.50	+ 1.0	9	9,402	....	....	....	...	17	4	9	4.4	
Raleigh	376	98	101	29.64	30.04	+ .06	62.2	+ 0.4	86	30	70	30	5	49	31	52	46	69	4.09	+ 0.8	10	4,272	ne.	26	nw.	4	14	9	7	4.4	
Wilmington	78	82	90	29.95	30.04	+ .06	62.3	+ 0.8	84	8	71	34	5	54	28	53	51	74	1.85	— 1.1	7	6,458	s.	30	sw.	12	13	8	9	4.5	
Charleston	48	14	92	30.00	30.05	+ .05	65.8	+ 1.2	86	7	78	39	5	59	32	58	52	70	3.42	— 0.2	11	8,026	s.	36	ne.	4	10	15	5	4.5	
Columbia	.....	5	.....	.....	.....	.....	68.6	+ 0.6	89	29	75	31	1	52	39	....	....	....	5.63	+ 2.9	7	.....	ne.	.....	.....	...	11	10	9	5.5	
Augusta	190	89	103	29.82	30.01	+.04	64.4	+ 0.2	86	7	75	32	1	54	41	57	51	71	7.59	+ 4.2	11	4,484	se.	28	sw.	2	10	12	8	4.9	
Savannah	63	79	89	29.96	30.02	.00	67.2	+ 1.1	86	29	76	40	1	58	31	59	55	76	4.99	+ 1.5	11	6,206	sw.	28	s.	18	14	10	6	4.3	
Jacksonville	43	69	84	29.98	30.03	+ .03	69.4	+ 0.5	87	29	78	42	1	60	30	62	58	76	7.34	+ 4.5	12	5,807	se.	30	s.	20	13	10	7	4.3	
Florida Peninsula.							72.5	— 0.5										78	2.36	+ 0.5								4.6		
Jupiter	28	13	30	29.99	30.02	+ .03	72.4	+ 0.4	87	24	78	54	6	67	25	67	65	81	2.16	— 0.3	7	8,189	se.	30	ne.	5	11	16	3	4.4	
Key West	22	43	50	29.98	30.00	+ .01	74.6	— 1.5	83	27	79	60	1	70	13	69	66	77	1.18	0.0	5	7,033	se.	28	nw.	1	12	14	4	4.3	
Tampa	34	60	67	29.98	30.02	+ .01	70.6	— 0.5	88	17	80	45	1	61	26	63	60	77	3.74	+ 1.8	9	4,819	se.	36	s.	20	12	10	8	5.0	
East Gulf States.							66.0	— 0.4										73	8.10	+ 3.7								5.1		
Atlanta	1,174	139	156	28.78	30.02	+ .01	66.5	— 1.0	83	29	73	31	1	53	33	54	48	66	6.27	+ 2.6	14	7,154	nw.	43	nc.	10	9	8	13	5.6	
Macon	370	93	98	.....	.....	.....	64.6	.....	86	28	76	31	1	53	43	....	....	....	4.80	.....	8	4,653	nw.	30	n.	11	9	17	4	4.0	
Pensacola	56	78	90	.....	.....	.....	66.5	— 1.2	84	25	72	43	1	61	19	....	....	....	4.19	+ 0.7	7	7,000	s.	48	se.	23	12	9	9	5.2	
Mobile	57	88	96	29.93	30.00	+ .01	66.2	— 0.7	86	25	74	39	1	59	28	61	58	83	7.17	+ 2.5	12	6,021	s.	32	s.	16	14	10	6	4.5	
Montgomery	223	100	112	29.76	29.99	— .02	66.2	+ 1.2	85	29	77	36	1	56	37	59	54	72	5.70	+ 0.9	12	4,630	sw.	27	w.	2	13	5	12	5.1	
Meridian	375	84	98	.....	.....	.....	66.6	+ 1.2	86	25	75	31	1	53	40	....	....	....	14.95	+10.2	12	4,205	sw.	27	nw.	26	8	14	8	5.6	
Vicksburg	347	65	73	29.67	29.94	— .04	64.2	— 1.4	86	25	75	42	1	57	28	58	52	67	9.60	+ 3.7	12	5,703	se.	39	e.	16	9	8	13	5.8	
New Orleans	51	112	120	29.91	29.97	.00	66.6	+ 0.8	87	9	76	47	1	61	22	63	60	79	10.69	+ 5.5	10	6,390	se.	37	s.	16	14	7	9	4.7	
Port Eads	.....	27	...	.....	.....	.....	68.6	— 0.4	84	9	76	47	1	60	30	62	58	76	6.25	+ 3.2	11	.....	e.	.....	.....	...	7	16	7	....	
West Gulf States.							66.8	— 2.6	82	29	74	45	2	59	24	....	....	....	5.01	+ 1.2								5.3		
Shreveport	249	77	84	29.66	29.93	— .02	66.1	— 0.9										76	4.77	— 0.4	13	5,238	s.	26	nw.	11	9	7	14	5.9	
Fort Smith	457	74	82	29.43	29.92	.00	66.2	— 0.2	88	26	76	36	12	56	28	58	53	72	3.99	— 1.1	15	5,665	e.	48	w.	24	5	12	13	6.8	
Little Rock	357	93	100	29.57	29.96	.00	63.2	+ 1.0	87	9	74	34	12	53	37	55	49	68	3.51	— 1.2	12	5,640	ne.	36	se.	17	10	13	7	5.2	
Corpus Christi	18	42	50	29.85	29.87	— .07	68.4	+ 0.2	86	24	78	33	12	53	30	55	50	68	2.07	+ 0.5	12	10,289	se.	47	nw.	7	6	9	15	6.2	
Fort Worth	670	106	114	.....	.....	.....	69.4	— 1.9	81	*	74	47	12	65	21	66	64	86	7.34	.....	11	8,959	se.	42	nw.	11	9	14	7	5.0	
Galveston	54	84	88	29.84	29.89	— .06	64.5	.....	83	23	75	33	12	54	31	....	....	....	4.65	+ 1.8	12	7,447	se.	36	ne.	30	7	9	14	6.5	
Palestine	510	54	61	29.36	29.91	— .04	67.2	— 2.4	80	30	71	47	12	63	19	64	62	87	7.00	+ 2.4	11	5,819	s.	26	se.	5	9	13	8	5.1	
San Antonio	701	95	104	29.13	29.87	— .06	67.8	— 2.3	86	16	78	36	12	58	35	61	58	78	9.11	+ 6.1	12	6,832	se.	42	n.	11	8	12	10	5.3	
Ohio Val. & Tenn.							56.3	+ 0.4										64	2.67	— 1.4								4.9		
Chattanooga	762	106	112	29.22	30.02	+ .03	61.1	+ 0.2	84	30	72	32	1	50	38	52	45	63	7.77	+ 3.2	16	4,770	w.	44	sw.	8	8	16	6	5.1	
Knoxville	1,004	10	88	28.96	30.02	+ .02	59.1	+ 0.9	84	25	70	29	1	48	42	50	43	66	1.92	— 3.0	15	5,251	ne.	36	s.	11	15	8	7	4.3	
Memphis	337	140	154	29.56	29.99	+ .03	62.8	+ 0.7	84	24	72	38	12	54	27	54	47	63	5.31	— 0.2	14	7,264	ne.	55	e.	8	6	13	11	6.1	
Nashville	546	128	134	29.43	30.02	+ .06	59.6	— 0.2	83	30	70	30	1	50	38	52	45	66	4.04	— 0.8	11	5,033	ne.	34	se.	10	8	12	10	5.7	
Lexington	989	75	102	.....	.....	.....	55.0	+ 0.5	79	29	65	26	10	45	29	....	....	....	1.23	— 2.5	7	8,169	ne.	40	s.	17	17	7	6	3.8	
Louisville	525	114	136	29.46	30.04	+ .06	56.8	+ 0.4	83	29	67	30	10	47	35	48	41	64	2.29	— 2.2	10	6,614	ne.	27	e.	11	13	9	8	4.9	
Evansville	434	72	82	.....	.....	.....	57.4	.....	84	29	67	31	12	48	33	....	....	....	1.17	.....	7	5,564	ne.	24	s.	8	15	6	9	4.3	
Indianapolis	822	154	164	29.15	30.04	+ .07	52.9	0.0	80	29	62	28	12	44	29	46	41	67	1.55	— 2.2	9	7,541	ne.	34	se.	16	11	8	11	5.4	0.3
Cincinnati	628	152	157	29.37	30.05	+ .07	54.4	— 0.2	81	29	64	28	10	45	30	46	39	60	1.43	— 1.8	8	6,233	ne.	30	sw.	18	12	7	11	5.3	T.
Columbus	834	87	100	29.17	30.06	+ .09	51.8	+ 0.6	80	29	62	25	10	42	34	44	37	62	1.76	— 1.4	9	6,078	ne.	26	sw.	18	13	7	10	5.0	0.2
Pittsburg	842	116	123	29.13	30.04	+ .05	52.2	+ 1.0	80	29	62	25	10	43	35	44	37	62	1.25	— 1.6	9	5,014	nw.	23	s.	18	13	11	6	4.6	0.5
Parkersburg	638	77	84	29.39	30.08	+ .10	53.6	+ 0.4	80	30	64	26	10	43	35	46	39	62	1.25	— 2.6	7	4,691	n.	25	nw.	6	18	6	6	3.9	T.
Elkins	1,940	41	50	.....	.....	.....	47.6	.....	76	30	60	18	10	35	44	....	....	....	1.37	.....	11	3,744	n.	24	s.	17	11	9	10	5.0	0.9
Lower Lake Region.							48.6	+ 1.9										69	1.68	— 0.7								5.0		
Buffalo	767	178	206	29.20	30.03	+ .08	43.5	+ 1.8	70	21	50	24	9	36	26	39	35	74	1.13	— 1.4	10	9,018	sw.	43	w.	19	8	11	11	5.9	0.5
Oswego	335	76	87	29.65	30.03	+ .04	43.8	+ 1.5	75	30	51	23	9	37	34	39	34	73	1.54	— 0.5	9	7,305	w.	31	w.	30	13	6	11	4.7	1.6
Rochester	523	81	90	29.46	30.04	+ .06	47.6	+ 4.1	74	18	56	25	9	39	28	40	33	64	1.68	— 0.8	9	5,710	nw.	34	w.	30	13	9	8	4.5	1.3
Erie	713	92	102	29.28	30.06	+ .09	45.6	+ 1.5	78	18	53	24	9	38	25	40	35	72	1.60	— 0.9	13	6,866	w.	42	s.	11	11	12	7	5.0	0.6
Cleveland	762	190	201	29.23	30.06	+ .07	47.2	+ 1.5	78	29	55	26	11	40	26	41	35	68	1.32	— 0.9	12	9,776	w.	42	nw.	4	14	7	9	4.7	1.6
Sandusky	629	62	70	29.37	30.06	+ .07	48.0	+ 1.0	80	29	56	25	10	40	25	42	36	68	1.80	— 0.7	10	5,542	ne.	36	ne.	30	10	5	15	5.9	T.
Toledo	628	128	128	29.37	30.06	+ .09	48.9	+ 1.4	81	29	58	27	10	40	32	42	36	65	2.73	+ 0.5	11	7,536	ne.	36	ne.	11	16	6	8	4.4	2.3
Detroit	730	160	166	29.25	30.05	+ .07	48.3	+ 2.6	80	29	57	26	11	40	30	42	37	69	1.64	— 0.6	10	6,916	ne.	35	sw.	18	9	12	9	5.1	1.5
Upper Lake Region.							44.6	+ 4.4										72	1.65	— 0.6								5.3		
Alpena	699	61	65	29.40	30.07	+ .07	42.8	+ 5.7	70	27	52	21	9	34	31	38	32	71	1.14	— 1.0	7	6,286	se.	40	nw.	30	14	8	8	4.8	0.6
Escanaba	612	43	57	29.40	30.07	+ .09	41.5	+ 5.7	68	5	51	21	4	32	43	37	33	76	2.22	+ 0.1	8	5,367	n.	36	w.	29	10	7	13	5.3	0.4
Grand Haven	632	55	64	29.35	30.04	+ .07	46.4	+ 2.8	72	29	55	23	11	38	31	41	36	72	1.59	— 0.9	10	6,804	sw.	30	sw.	29	12	12	6	4.6	4.5
Marquette	734	67	95	29.28	30.08	+ .08	43.4	+ 6.2	81	20	50	23	4	36	37	39	34	74	2.89	+ 0.9	9	5,288	n.	32	sw.	29	10	8	12	5.5	4.5
Port Huron	638	70	108	29.38	30.09	+ .11	44.7	+ 3.0	80	29	58	23	11	36	31	39	34	73	1.30	— 0.8	14	7,923	n.	36	e.	11	12	4	14	5.6	2.1
Sault Ste. Marie	614	40	61	29.38	30.05	+ .05	43.3	+ 5.6	77	28	54	18	9	33	40	38	32	71	1.29	— 0.3	6	5,383	w.	49	nw.	30	11	11	8	4.7	T.
Chicago	823	241	274	29.16	30.05	+ .08	46.8	+ 1.2	79	29	54	28	11	40	27	42	37	74	1.02	— 2.1	8	12,479	ne.	46	ne.	8	11	12	7	4.7	3.6
Milwaukee	681	124	142	29.32	30.07	+ .09	47.3	+ 4.6	78	29	55	27	4	40	32	41	35	69	1.74	— 1.1	7	8,048	ne.	33	ne.	9	6	10	14	6.5	5.4
Green Bay	617	49	57	29.39	30.08	+ .09	45.4	+ 2.4	80	29	55	23	4	36	36	40	35	72	2.88	+ 0.7	11	5,499	n.	36	sw.	29	8	8	14	6.0	7.0
Duluth	702	95	106	29.30	30.07	+ .07	44.7	+ 6.8	76	19	53	24	4	36	38	38	31	65	0.39	—2.0	5	7,473	ne.	37	nw.	29	8	15	7	5.2	0.1
North Dakota.							55.5	+ 3.3										60	1.04	— 0.9								3.8		
Moorhead	935	54	60	29.02	30.04	+ .06	50.4	+ 9.1	84	20	64	21	14	36	44	42	35	63	1.98	— 0.2	5	8,576	se.	40	se.	26	16	8	6	4.0	T.
Bismarck	1,674	16	29	28.23	30.01	+ .04	50.7	+ 8.6	90	20	64	23	17	37	46	42	33	58	0.58	— 1.7	5	7,327	se.	36	se.	25	19	6	5	3.6	
Williston	1,875	15	31	27.98	29.97	.00	51.4	+ 8.8	84	20	65	21	12	38	43	43	34	60	0.57	— 0.8	4	6,546	se.	34	n.	18	19	8	3	3.9	

TABLE I.—*Climatological data for Weather Bureau Stations, April, 1900*—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Elevation of instruments: Thermometers above ground.	Elevation of instruments: Anemometer above ground.	Pressure, in inches: Mean actual, 8 a. m. + 8 p. m. + 2.	Pressure, in inches: Mean reduced.	Pressure, in inches: Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. + mean min. + 2.	Temperature: Departure from normal.	Temperature: Maximum.	Temperature: Date.	Temperature: Mean maximum.	Temperature: Minimum.	Temperature: Date.	Temperature: Mean minimum.	Temperature: Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Precipitation: Departure from normal.	Precipitation: Days with .01, or more.	Wind: Total movement, miles.	Wind: Prevailing direction.	Wind: Maximum velocity: Miles per hour.	Wind: Maximum velocity: Direction.	Wind: Maximum velocity: Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Upper Miss. Valley.																														
Minneapolis	.....	99	208	.....	.....	.....	54.3	+ 3.1										66	2.04	— 1.0									5.1	
St. Paul	837	114	124	29.12	30.03	+ .06	32.8	+ 5.7	81	28	63	26	10	42	33	....	....	....	1.76	— 1.0	8	9,599	se.	40	nw.	29	8	13	9	....	1.5
La Crosse	714	70	78	.....	.....	.....	52.1	+ 6.9	80	28	62	28	10	42	34	44	35	59	1.80	— 0.7	6	5,761	se.	30	nw.	29	12	11	7	4.8	1.6
Davenport	606	71	79	29.36	30.02	+ .05	51.8	+ 4.4	80	28	62	27	11	41	33	....	....	....	2.48	+ 0.2	10	4,974	s.	24	nw.	29	9	12	9	5.1	5.0
Des Moines	861	84	88	29.09	30.02	+ .07	52.6	+ 2.9	81	29	62	28	12	43	34	45	38	65	2.10	— 0.7	10	5,985	ne.	33	ne.	8	10	7	13	5.5	T.
Dubuque	698	101	109	29.28	30.04	+ .08	54.4	+ 3.9	80	27	65	28	12	44	35	48	43	72	3.82	+ 1.0	10	6,666	se.	34	e.	9	9	15	6	5.1	0.1
Keokuk	614	63	78	29.35	30.01	+ .06	51.6	+ 3.0	80	29	62	27	12	41	35	44	38	65	2.39	— 0.4	6	5,285	ne.	34	nw.	29	10	15	5	4.6	3.5
Cairo	356	87	93	29.61	30.00	+ .06	54.6	+ 2.6	82	29	64	28	12	45	34	48	42	69	2.10	— 1.1	9	5,817	e.	30	w.	18	14	8	8	4.4	T.
Springfield, Ill.	644	82	92	29.32	30.02	+ .05	53.2	+ 0.3	82	28	68	33	12	50	33	52	47	72	1.79	— 2.1	10	6,244	ne.	38	n.	10	8	12	10	6.4	T.
Hannibal	534	75	110	.....	.....	.....	54.7	+ 1.3	83	29	65	27	12	44	31	46	38	61	1.06	— 2.6	9	7,459	e.	30	ne.	8	10	10	10	5.5	1.3
St. Louis	567	111	210	29.38	29.99	+ .04	55.4	+ 1.7	84	29	66	27	12	45	38	....	....	....	1.34	— 1.2	8	7,348	ne.	36	s.	17	12	10	8	4.7	1.4
Missouri Valley.							58.0	+ 1.8	82	29	67	32	12	49	31	51	45	66	1.83	— 2.0	10	7,644	e.	35	w.	17	13	6	11	4.9	T.
Columbia							54.7	+ 3.7										63	3.35	+ 0.3									6.0	
Kansas City	963	78	95	28.95	29.97	+ .03	56.2	— 1.3	85	29	68	28	11	45	41	....	....	....	3.02	— 1.5	10	6,893	e.	31	ne.	10	7	9	14	6.5	4.1
Springfield, Mo.	1,324	100	103	28.56	29.96	+ .01	58.0	+ 3.6	82	26	67	32	11	49	32	48	40	59	3.62	+ 0.7	9	5,680	se.	26	se.	16	7	10	13	6.1	T.
Topeka	.....	81					58.0	+ 0.5	81	27	67	28	11	49	29	51	47	74	3.23	— 0.7	15	7,988	se.	34	se.	15	12	10	8	5.5	T.
Lincoln	1,189	75	84	28.68	29.95	— .01	57.4	+ 0.6	82	26	68	27	13	47	38	....	....	....	2.33	— 0.1	8	.....	e.	....	.....	...	3	16	11	6.5	0.3
Omaha	1,105	115	121	28.78	29.96	+ .01	54.4	+ 3.0	80	26	65	24	12	44	41	46	39	65	4.33	+ 1.9	12	8,721	se.	36	ne.	10	8	8	14	6.3	T.
Valentine	2,598	39	40	27.24	29.96	— .04	55.6	+ 4.6	79	27	65	27	12	46	33	48	42	69	3.43	+ 0.3	12	6,625	se.	38	ne.	10	4	17	9	6.1	T.
Sioux City	1,135	96	164	.....	.....	.....	50 0	+ 2.8	77	19	61	23	13	39	45	43	34	63	4.70	+ 1.9	11	9,109	s.	44	s.	7	5	7	18	7.0	1.6
Pierre	1,572	11	19	28.29	29.96	— .03	52.9	+ 4.9	78	27	63	26	11	42	36	....	....	....	3.80	+ 0.7	10	10,369	e.	45	se.	24	10	9	11	5.7	T.
Huron	1,306	56	67	28.59	29.99	+ .01	53.6	+ 7.3	87	20	67	23	13	41	46	43	31	50	1.98	0.0	9	10,176	e.	43	se.	7	9	8	13	5.7	T.
Yankton	1,233	52	58	.....	.....	.....	51.8	+ 7.4	81	19	65	22	13	39	45	44	36	64	2.16	— 0.8	8	9,909	se.	45	se.	26	14	9	7	4.4	T.
Northern Slope.							53.5	+ 6.8	78	19	64	25	11	42	40	....	....	....	4.27	+ 1.2	11	7,990	e.	37	se.	24	8	11	11	6.1	0.4
Havre	2,505	46	47	27.29	29.93	— .04	47.6	+ 2.9										67	3.33	+ 2.2									5.6	
Miles City	2,371	42	50	27.36	29.88	— .10	49.5	+ 5.5	74	30	62	20	17	37	45	42	35	66	1.38	+ 0.4	5	7,130	nb.	38	e.	3	14	11	5	4.3	T.
Helena	4,110	88	93	25.75	29.96	— .04	53.0	+ 6.4	84	30	66	24	12	40	42	46	42	75	0.96	— 0.1	6	4,445	se.	38	s.	4	17	9	4	3.7	
Kalispell	2,965	45	51	26.85	29.94	.....	47.4	+ 3.9	72	19	57	30	12	38	33	40	30	58	2.49	+ 1.4	8	5,411	sw.	34	sw.	7	8	3	19	6.6	3.7
Rapid City	3,234	46	50	26.53	29.88	— .12	48.0	.....	75	30	60	26	8	36	43	40	32	59	1.33	.....	6	4,181	nw.	33	w.	7	12	14	4	4.3	0.0
Cheyenne	6,088	56	64	23.90	30.00	+ .01	49.8	+ 3.2	82	20	60	28	11	40	39	42	34	63	3.81	+ 1.5	13	5,818	s.	32	se.	25	9	10	11	5.7	5.1
Lander	5,372	28	36	24.54	29.96	— .03	40.2	— 0.7	69	20	50	6	11	30	36	35	29	73	7.66	+ 6.3	15	6,731	nw.	41	se.	3	8	8	14	6.3	38.5
North Platte	2,821	43	52	27.01	29.96	+ .01	42.8	+ 0.3	72	20	53	9	12	33	44	37	31	72	7.19	+ 4.9	15	2,947	nw.	44	sw.	2	1	7	22	7.9	32.7
Middle Slope.							50.6	+ 2.0	73	2	60	24	11	41	41	44	39	69	3.34	+ 1.2	12	8,484	se.	47	s.	25	8	9	13	6.0	0.2
Denver	5,291	79	151	24.62	29.99	+ .03	53.3	— 0.3										69	5.10	+ 3.1									6.0	
Pueblo	4,685	80	86	25.16	29.92	.....	44.6	— 2.3	72	21	55	8	11	34	34	37	30	66	8.24	+ 6.2	16	6,370	n.	52	se.	3	8	11	11	5.7	19.6
Concordia	1,398	42	47	28.45	29.94	— .00	46.6	— 3.9	74	1	58	20	11	35	42	40	33	68	8.13	+ 6.7	15	6,028	n.	42	n.	10	12	9	9	5.4	2.4
Dodge	2,509	44	52	27.28	29.90	— .02	55.9	+ 0.6	83	26	67	27	11	45	36	48	43	71	4.02	+ 2.0	15	6,307	se.	30	ne.	10	5	13	12	6.2	0.8
Wichita	1,358	78	85	28.49	29.92	— .00	54.2	+ 0.5	86	2	65	18	11	43	44	46	41	74	4.08	+ 2.5	14	9,346	se.	45	se.	6	8	12	10	5.6	7.5
Oklahoma	1,214	54	62	28.60	29.89	— .01	58.2	+ 0.4	82	26	68	32	12	48	36	50	44	66	2.77	+ 0.5	11	6,943	s.	30	se.	4	5	12	13	6.3	0.4
Southern Slope.							60.2	— 0.2	81	26	70	32	11	50	37	52	47	68	3.35	+ 0.5	14	8,275	s.	39	sw.	24	7	8	15	6.5	T.
Abilene	1,738	45	54	28.05	29.87	— .06	57.4	— 2.9										66	5.45	+ 3.6									6.7	
Amarillo	3,676	54	61	26.10	29.87	— .04	62.6	— 2.7	84	3	73	33	12	52	32	54	47	64	5.43	+ 2.7	12	7,254	se.	44	e.	5	14	11	5	4.3	
Southern Plateau.							52.2	— 3.1	81	2	64	22	10	41	37	45	38	68	5.47	+ 4.6	12	12,502	sw.	64	e.	4	9	13	8	4.5	
El Paso	3,762	10	110	26.04	29.86	— .03	55.7	— 4.1										33	1.44	+ 1.0									5.1	
Santa Fe	7,013	47	50	23.10	29.89	— .03	59.4	— 4.4	84	20	74	34	11	45	42	42	30	80	0.02	— 0.1	1	9,824	nw.	54	sw.	14	23	6	1	3.2	
Flagstaff	6,907	12	25	23.18	30.01	.....	44.0	— 2.6	66	20	54	19	11	34	28	34	19	46	2.10	+ 1.4	10	5,656	sw.	38	sw.	3	13	12	5	2.3	
Phenix	1,108	47	57	28.69	29.86	— .01	37.7	.....	68	19	49	10	24	26	42	33	....	....	4.21	+ 3.1	15	.....	sw.	...	.....	...	1	10	19	4.3	11.6
Yuma	141	16	50	29.66	29.80	— .08	63.0	— 3.7	92	19	75	40	10	51	37	49	35	44	1.12	+ 0.8	3	3,606	w.	23	nw.	4	17	7	6	....	31.7
Independence	3,910	51	58	25.84	29.82	— .11	65.2	— 4.6	95	19	79	41	10	52	42	50	35	40	0.53	+ 0.5	4	6,401	w.	36	w.	7	24	4	2	3.9	
Middle Plateau.							52.0	— 5.8	81	19	64	33	9	40	33	39	17	31	0.62	+ 0.4	4	8,740	nw.	52	w.	2	15	12	8	1.7	
Carson City	4,720	82	92	25.16	29.97	— .01	46.9	— 2.6										53	1.81	+ 0.6									3.8	
Winnemucca	4,344	59	70	25.56	29.96	— .00	43.6	— 4.6	73	18	55	22	10	32	41	36	25	50	2.12	+ 1.2	8	6,352	sw.	38	sw.	7	5	10	15	6.7	
Cedar City	5,850	36	47	24.09	29.93	.....	43.4	— 3.9	77	18	55	18	10	32	44	36	24	52	0.96	0.0	9	7,546	nw.	46	s.	19	3	7	20	8.6	9.0
Salt Lake City	4,366	105	110	25.47	29.90	— .08	43.2	.....	70	19	52	24	10	35	27	35	24	57	3.65	.....	15	4,756	se.	32	se.	21	4	7	19	8.6	0.6
Grand Junction	4,608	43	50	25.21	29.86	.....	49.1	— 0.4	78	19	58	30	9	40	32	41	32	59	2.91	+ 0.7	14	5,271	nw.	38	s.	2	9	14	7	7.1	18.2
Northern Plateau.							51.4	— 1.4	79	20	63	32	11	40	36	40	26	49	1.26	+ 0.6	12	4,713	nw.	31	nw.	15	5	9	16	5.3	1.8
Baker City	3,471	53	58	26.36	29.97	— .05	42.3	+ 0.6										68	2.27	+ 0.9									6.6	
Boise	2,739	61	68	27.06	29.92	— .08	45.8	+ 1.2	71	1	55	24	8	36	32	38	29	58	1.49	+ 0.3	8	6,195	s.	32	n.	23	4	8	18	6.3	
Pocatello	4,482	48	56	25.33	29.89	— .11	51.0	+ 0.1	81	1	62	29	8	40	35	42	33	58	1.96	+ 0.8	8	4,949	nw.	28	nw.	22	6	9	15	6.7	6.7
Spokane	1,943	99	107	27.91	29.97	— .02	46.0	— 0.8	74	19	55	24	8	36	35	40	32	82	3.31	+ 1.8	14	6,307	w.	36	w.	2	8	6	16	6.8	1.7
Walla Walla	1,000	65	73	28.90	29.97	— .02	51.1	+ 3.1	80	30	62	28	9	40	36	43	35	62	1.09	— 0.3	10	4,403	s.	29	sw.	7	6	8	16	6.6	8.9
N. Pac. Coast Reg.							52.6	— 0.7	79	*	62	32	8	43	34	49	47	82	3.49	+ 1.9	11	4,826	s.	27	s.	6	11	11	8	6.4	T.
Neah Bay	50	7	24	29.97	30.03	+ .01	50.1	+ 1.1										74	2.34	— 2.2									5.0	T.
Port Crescent	259	15	20	.....	.....	.....	47.8	+ 0.2	62	29	53	35	7	42	19	44	44	84	4.15	— 4.4	12	5,470	w.	38	w.	24	8	15	7	5.6	
Seattle	123	114	121	29.90	30.03	+ .01	47.0	+ 2.4	78	*	56	30	*	38	37	....	....	....	1.79	— 2.3	13	3,662	w.	45	w.	6	7	15	8	5.2	
Tacoma	213	113	120	.....	.....	.....	51.8	+ 1.9	81	30	60	35	7	44	32	46	41	71	1.55	— 1.7	9	3,818	se.	35	s.	6	8	13	9	5.4	T.
Astoria	30	57	64	30.04	30.06	+ .02	50.4	+ 1.5	80	30	59	32	8	42	34	....	....	....	1.77	— 1.7	9	4,016	n.	34	sw.	6	9	3	18	5.4	0.6
Portland, Oreg	154	208	213	29.86	30.02	— .03	49.9	+ 1.2	81	29	57	34	9	42	34	47	....	....	3.45	— 2.8	15	4,426	nw.	38	sw.	6	8	12	10	6.5	
Roseburg	518	56	67	29.42	29.99	— .07	52.2	+ 0.6	84	29	61	34	8	44	30	46	40	67	1.30	— 2.0	12	5,846	nw.	36	w.	25	9	10	11	5.6	
Mid. Pac. C'st Reg.							51.3	+ 0.1	82	29	61	31	9	41	37	46	40	72	2.38	— 0.2	15	2,944	nw.	22	sw.	6	9	10	11	5.4	T.
Eureka	62	60	69	29.97	30.03	— .02	54.7	— 0.7										70	2.52	— 0.1									5.7	
Mount Tamalpais	2,375	11	18	27.49	29.99	.....	50.5	+ 0.9	68	10	56	36	8	45	35	47	44	81	4.43	+ 0.3	11	6,937	nw.	40	n.	20	12	9	9	4.3	
Red Bluff	332	50	56	29.59	29.95	— .04	48.6	.....	72	17	55	33	26	42	30	42	36	70	2.52	.....	14	17,201	nw.	75	nw.	6	16	4	10	4.8	
Sacramento	69	106	117	29.86	29.94	— .06	57.6	— 1.7	84	28	68	39	9	47	35	49	40	59	2.69	+ 0.5	10	5,423	n.	30	n.	27	18	5	7	4.0	
San Francisco	155	161	167	29.83	29.99	— .03	56.7	— 1.5	80	28	66	39	10	47	34	50	44	65	1.88	— 0.4	8	7,481	se.	40	nw.	8	13	7	10	3.8	
Point Reyes Light†	.....	12	16	.....	.....	.....	54.0	— 0.6	69	15	60	45	26	48	19	49	45	76	1.08	— 0.9	6	8,513	w.	35	w.	16	16	8	6	4.9	
S. Pac. Coast Reg.							49.8	— 0.6	61	1	55	40	9	45	20	....	....	....	2.51	+ 0.8	9	16,272	nw.	75	nw.	25	11	3	16	3.8	
Fresno	330	67	70	29.57	29.92	— .07	56.5	— 2.2										70	1.00	— 0.4									5.9	
Los Angeles	338	74	82	29.58	29.94	— .04	58.3	— 2.5	91	18	70	38	9	47	38	49	40	61	1.21	— 0.1	8	4,396	nw.	26	nw.	7	18	7	5	3.7	
San Diego	87	94	102	29.86	29.96	— .04	56.8	— 2.1	76	16	67	40	9	47	31	50	45	73	0.54	— 0.8	5	3,586	w.	22	w.	8	11	15	4	3.9	
San Luis Obispo	201	10	46	29.79	30.01	+ .01	56.8	— 1.5	67	16	62	45	28	52	19	51	46	71	1.26	+ 0.5	6	5,426	nw.	30	nw.	3	23	3	4	4.5	
West Indies.							54.2	— 2.6	80	16	65	34	8	44	38	47	43	73	0.98	— 1.0	6	4,114	w.	28	w.	26	15	6	9	3.0	
Basseterre	29	41	54	29.97	30.00	.....	77.8	.....	86	28	83	68	19	73	14	72	70	77	2.64	.....	18	8,064	e.	24	ne.	22	9	12	9	5.6	
Bridgetown	30	57	65	29.93	29.96	.....	80.2	.....	88	29	86	70	5	74	15	74	71	75	1.50	+ 0.3	12	7,248	e.	24	se.	28	8	24	3	5.6	
Cienfuegos	52	62	67	29.89	29.94	.....	77.2	.....	91	15	86	60	8	69	22	72	69	78	0.67	.....	2	3,864	ne.	24	nw.	26	15	8	0	2.8	
Havana	57	83	100	29.93	29.99	.....	75.7	.....	89	25	82	60	7	69	22	70	68	81	0.29	— 2.5	3	7,569	e.	38	ne.	16	4	18	8	6.1	
Kingston	286	38	52	29.64	29.94	.....	77.4	.....	89	19	83	64	7	70	21	71	68	75	2.25	.....	11	4,493	ne.	26	se.	22	3	23	4	5.7	
Port of Spain	40	65	66	29.88	29.92	.....	80.4	.....	90	4	88	70	11	73	20	74	72	77	3.23	.....	15	3,631	e.	19	e.	26	6	11	13	6.4	
Puerto Principe	352	55	62	29.64	29.99	.....	75.6	.....	91	24	86	54	7	65	26	69	68	84	3.48	.....	8	5,160	ne.	26	e.	17	10	14	6	5.1	
Roseau	25	37	47	29.94	29.96	.....	80.0	.....	89	29	86	71	5	74	15	71	68	68	1.00	....	13	4,623	e.	25	ne.	18	9	17	4	4.9	
San Juan	82	48	73	29.91	29.99	.....	77.5	.....	93	25	83	68	8	72	18	71	69	75	5.92	+ 2.3	19	9,227	e.	31	e.	20	11	17	2	4.3	
Santiago de Cuba	82	26	33	29.87	29.95	.....	78.6	.....	93	15	88	59	7	70	24	71	69	75	3.01	.....	6	2,967	ne.	18	nw.	5	12	12	6	5.0	
Santo Domingo	57	37	44	29.95	30.01	.....	76.2	.....	91	29	83	59	7	69	25	71	69	80	3.46	.....	16	4,626	n.	24	n.	6	8	19	3	4.6	
Willemstad	75	39	46	29.82	29.89	.....	81.2	.....	92	29	86	73	19	77	14	74	72	77	0.24	.....	3	9,627	e.	30	e.	19	10	14	6	4.6	

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote number of days missing from the record. *Two or more dates. †Received too late to be considered in departures, etc.

TABLE II.—*Climatological record of voluntary and other cooperating observers, April, 1900.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Ashville	86	26	62.4	12.56	
Bermuda	91	30	67.0	9.20	
Birmingham	88	35	66.2	13.06	
Brewton	90	33	66.8	7.04	
Bridgeport				8.35	
Citronelle	84	40	67.0	6.19	
Clanton	85	30	63.4	6.70	
Decatur	87	29	62.0	7.65	
Demopolis				14.12	
Elba				4.77	
Eufaula[a]	90	30	65.4	5.00	
Eufaula[c]				4.84	
Eutaw	88	38	65.8	19.64	
Evergreen	85	30	66.2	5.40	
Florence[a]				9.12	
Florence[b]	84	28	62.0	9.39	
Fort Deposit	85	37	64.8	7.42	
Gadsden	86	27	63.3	11.84	
Goodwater	88	26	61.5	6.10	
Greensboro	86	35	64.4	12.95	
Hamilton	86	26	61.2	8.81	
Healing Springs	89	34	65.8	11.39	
Highland Home	84	37	66.2	7.87	
Livingston[a]	85	32	64.0		
Livingston[b]	85	34	64.4	17.17	
Lock No. 4	86	28	61.7	9.36	
Madison Station	86	27	62.2	11.69	
Maplegrove	87	30	61.0	11.86	
Marion	89	35	65.0	8.62	
Mount Willing	85[f]	38[f]	62.2°	7.40	
Newbern	85	32	65.6	8.30	
Newburg				12.09	
Newton	84	31	62.0	5.42	
Oneonta	83	24	61.3	11.03	
Opelika	86	32	63.8	4.51	
Oxanna	84	28	61.8	8.99	
Pineapple	90	28	65.7	8.33	
Prattville	89	29	66.0		
Pushmataha	87	32	65.0	13.87	
Riverton	83	27	59.5	8.18	
Rockmills	87	29	64.6	3.27	
Scottsboro	84	32	60.9	12.07	
Selma	88	33	65.0	7.38	
Talladega				6.16	
Tallassee				5.55	
Thomasville	88	38	66.6	7.32	
Tuscaloosa	89	30	63.0	15.67	
Tuscumbia	83	30	60.6	10.19	
Tuskegee	88	31	64.7	5.93	
Union Springs	86	39	66.4	8.30	
Uniontown	87	39	66.6	6.38	
Valleyhead	85	30	61.4	11.40	
Warrior				9.43	
Wetumpka	90	29	65.8	6.54	
Alaska.					
Sitka	59	30	41.0	12.09	1.2
Arizona.					
Allaire Ranch				0.60	T.
Arivaca	90	30	56.1	1.74	
Arizona Canal Co. Dam	89	46	66.2	1.56	
Aztec[e5]	97	51	69.8	1.31	
Benson[e1]	78	46	61.8	0.27	
Bisbee	78	29	52.4	0.97	1.0
Bowie[e5]	82	50	67.8	0.00	
Buckeye	93	35	62.3	1.00	
Camp Creek	84	37	56.5	2.63	
Casagrande[e1]	91	46	67.2	0.55	
Champie Camp	95	34	59.8	2.90	
Congress	85	37	57.0	1.76	
Dragoon Summit[e1]	77	40	58.7	0.22	T.
Dudleyville	89	32	59.4	1.10	
Fort Apache	80	25	52.9	1.75	T.
Fort Defiance	69	21	42.3	1.36	4.0
Fort Grant	78	32	53.0	0.48	
Fort Huachuca	79	31	54.0	1.29	
Fort Mohave	102	41	67.1	0.13	
Gilabend[e1]	94	51	66.5	1.10	
Holbrook	80	23	50.8	1.51	0.5
Jerome	80	32	50.8	3.00	T.
Maricopa[e1]	94	46	64.4	0.40	
Mesa	91	30	61.9	1.32	
Mount Huachuca	80	29	52.8	1.46	
Music Mountain	92	35	59.6	1.00	
Natural Bridge				4.12	
Nogales	87	30	55.4	1.27	T.
Oracle	80	31	54.0	2.16	
Oro				0.75	
Pantano[e1]	85	40	59.0	0.48	T.
Parker	99	35	65.6	0.32	
Peoria	95	39	63.9	1.08	
Phenix	94	34	62.0	0.95	
Pima	90	26	56.8	0.49	
Final Ranch				2.36	0.5
Prescott	79	23	45.4	2.67	T.
Russellville				0.00	
San Carlos	90	32	58.5	0.87	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arizona—Cont'd.	°	°	°	*Ins.*	*Ins.*
San Simon[e1]	78	50	65.8	0.77	
Sentinel[e1]	100	53	68.4	0.92	
Signal	97°	36	62.2°	1.15	
Silverking				2.71	
Snowflake	78	21	46.2	1.26	4.5
Strawberry	74	17	42.8	3.61	19.5
Supai	92	37	58.7	2.72	
Texas Hill[e1]	100	55	68.4	0.95	
Tonto	89	27	53.5	2.80	
Tucson	88	35	59.1	1.12	
Vail[e5]	87	47	62.4	0.80	
Walnutgrove				2.11	
Willcox[e1]	80	39	57.9	0.14	
Winslow	78	23	50.0	0.84	T.
Yarnell				2.99	4.0
Arkansas.					
Amity	89	28	63.3	4.56	
Arkadelphia	90	30	63.6	6.36	
Arkansas City				9.20	
Batesville	86	30	63.1	2.57	
Beebranch[c]	87	28	61.6	4.25	
Blanchard Springs	86	30	63.6	6.48	
Brinkley	89	31	61.3	5.91	
Camden[a]				6.50	
Camden[b,2]	90	31	64.2	6.35	
Canton	86	28	60.2	4.69	
Conway	96	29	65.4	1.83	
Corning	87	32	60.6	3.62	
Dallas	90	30	64.0	5.92	
Dardanelle				3.13	
Elon	88	30	63.4	7.88	
Fayetteville	88	29	60.2	3.39	T.
Fulton				4.24	
Hardy	84	30	60.8	4.85	
Helena[a]				4.88	
Helena[b]	86	35	61.8	4.41	
Hot Springs[b]				5.75	
Jonesboro	91	32	64.6	3.86	
Keesees Ferry	84	27	60.4	3.29	
Lacrosse	85	29	60.5	4.22	
Lonoke	90	30	63.0	3.32	
Luna Landing	85	33	65.5	7.09	
Lutherville	85	28	61.4	5.68	
Malvern	84	29	61.0	4.54	
Mariana	85	31	63.0	3.32	
Marvell	85	34	63.1	4.93	
Mount Nebo	84	32	60.1	5.53	T.
Newport[a]				4.35	
Newport[b]	86	30	60.7	4.36	
Newport[c]	89	30	62.4	4.20	
Osceola	90	32	63.3	3.62	
Ozark	87	31	63.9	2.58	
Pinebluff	89	32	61.1	6.93	
Pocahontas	86	28	59.8	3.16	
Pond	85	24	59.4	2.24	
Powell	88	32	60.9	3.99	
Prescott	88	30	63.9	5.17	
Rison	89	32	65.4	10.06	
Russellville	80	31	60.8	4.11	
Silversprings	89	29	60.8	4.18	T.
Spielerville	89	35	63.0	5.04	
Stamps	86	31	62.7	5.98	
Stuttgart	87	31	62.5	4.09	
Texarkana	91	42	67.4	6.28	
Warren	88	32	62.5	7.19	
Washington	88	31	63.5	5.63	
Wiggs	88	27	62.4	5.37	
Winslow	80	31	56.6	6.68	T.
Witts Springs	85	24	56.0	6.32	0.2
California.					
Anada				5.45	
Angiola	91	30	57.0	1.22	
Azusa				1.77	
Bakersfield	92	34	58.6	0.78	
Ballast Point L. H				1.25	
Bear Valley				7.10	15.0
Bellevue				0.79	
Berkeley	70	40	54.2	1.58	
Bishop	85[f]	21[f]	50.8[f]	0.60	
Boca[e1]	64	17	36.0	4.27	26.0
Bodie	65	4	30.2	2.57	24.5
Bowman				0.62	12.0
Branscomb				5.38	
Caliente				1.75	
Campbell	76	30	54.0	1.01	
Cape Mendocino L. H				5.10	
Cedarville	73	18	44.8	0.92	2.0
Chico[e1]	90	43	59.4	2.47	
Cisco[e1]	57	23	36.2	4.85	33.0
Claremont	77	31	53.0	0.67	
Corning[e1]	84	45	59.0	2.84	
Coronado	67	51	59.2		
Craftonville	84	37	54.7	1.97	
Crescent City	70	32	49.6	6.48	
Crescent City L. H				6.63	
Cuyamaca	68	20	39.4	6.69	7.6

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Delano[e1]	75	43	55.5	0.89	
Delta[e1]	82	38	54.8	8.59	
Deweyville	90	30	58.4	0.12	
Drytown	82	32	56.2	3.39	
Dunnigan[e1]	81	45	57.0	1.48	
Durham[e1]	81	38	56.6	2.43	
East Brother L. H				0.50	
Edmanton[e1]	74	24	48.1	6.24	12.0
Elcajon	82	34	56.3	1.30	
Elmdale	84	30	56.0	1.94	
Elsinore	92	29	56.5	0.77	
Escondido	76	29	53.0	2.23	
Fallbrook[e1]	82	40	54.7	1.00	
Folsom City[e1]	85	44	58.2	2.82	
Fordyce Dam				5.06	36.0
Fort Ross	70	38	52.0	5.61	
Georgetown	75	31	50.1	5.46	
Gilroy Hot Springs				0.84	
Gilroy (near)	81	29	54.2	1.55	
Glendora				0.77	
Goshen[e1]	88	42	63.2	1.83	
Grand Island[e5]	82	44	61.6	1.44	
Grass Valley				4.63	
Greenville	78	20	46.0	3.12	T.
Hanford	89	32	57.8	1.04	
Healdsburg	85	33	56.2	3.48	
Hollister	79	28	53.0	1.67	
Humboldt L. H				4.59	
Indio[e1]	98	36	61.4	0.15	
Iowa Hill[e1]	74	39	50.8	4.59	
Irvine	86	50	67.2	1.09	
Jackson	66	32	46.4	3.52	
Johnsville				4.00	46.0
Jolon				0.68	
Kennedy Gold Mine	74	28	49.4	4.44	
Kernville				0.52	
King City[e1]	80	34	50.5	0.82	
Kono Tayee	76	38	54.8	2.32	
Lagrange[e5]	83	36	58.5	2.73	
Lamesa				1.73	
Lankershim	89	31	57.2	1.79	
Laporte[e1]	66	25	40.2	6.51	28.9
Las Fuentes Ranch				0.42	
Legrand	88	29	56.6	1.37	
Lemoncove	93	35	58.8	2.82	
Lemoore[a][e1]	87	36	58.6	0.96	
Lick Observatory	66	28	43.0	4.06	
Lime Point L. H				1.20	
Lodi	80	32	56.8	2.36	
Los Gatos[b]	81	34	54.5	1.73	
Mammoth[e1]	90	50	66.7	0.30	
Manzana	84	35	53.3	0.42	
Mare Island L. H				1.87	
Merced[b]	87	31	55.8	1.83	
Mills College				1.62	
Milo				4.59	
Milton (near)[e1]	78	35	54.4	3.67	
Modesto[e1]	86	44	59.6	1.70	
Mohave[e1]	80	40	51.0	0.21	
Mokelumne Hill[e5]		35	49.5	3.32	
Monterio	74	32	49.2	3.53	
Monterey[e5]	68	38	55.8	1.55	
Morena				3.60	T.
Mountainview				0.69	
Napa[b]	80	34	55.6	1.60	
Needles	93	47	70.7	0.06	
Nevada City	74	29	48.5	4.83	2.0
Newhall[e1]	88	35	55.9	0.25	
North Bloomfield	76	30	49.8	6.82	
North Ontario	78	37	52.4	1.68	
North San Juan[e1]	80	32	52.4	4.87	
Oakland[a]	75	41	55.6	1.48	
Ogilby[e1]	102	55	70.5	0.00	
Oleta[e1]	73	37	50.8	3.87	
Orland[e1]	85	40	55.8	2.72	
Palermo	82	32	57.8	1.86	
Palmdale				0.57	
Paso Robles[b]	87	27	53.2	0.42	
Peachland[e5]	74	40	55.8	4.16	
Piedras Blancas L. H				1.56	
Pigeon Point L. H				0.78	
Pilot Creek				5.69	7.0
Pine Crest	76	41	56.4	0.62	
Point Ano Nuevo L. H				1.42	
Point Arena L. H				3.18	
Point Bonita L. H				2.06	
Point Conception L. H				0.61	
Point Firmin L. H				0.20	
Point George L. H				4.92	
Point Hueneme L. H				0.19	
Point Lobos	63	45	52.0	1.44	
Point Loma L. H				0.69	
Point Montara L. H				1.62	
Point Pinos L. H				1.69	
Point Sur L. H				1.83	
Pomona (near)	86	35	58.0	0.95	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Poway *3	75	43	52.8	1.48	
Quincy	75	24	46.4	3.54	T.
Ranch House				1.32	
Raymond	85	27	53.6	2.95	
Redding	82	39	57.2	2.59	
Redlands	87	37	55.9	2.06	
Reedly	88	33	57.8	1.82	
Represa	78	36	55.9	3.12	
Riovista	80	39	57.1	0.94	
Riverside	87	36	56.5	0.74	
Roe Island L. H				1.29	
Rosewood	86	28	54.0	2.42	
Sacramento *a*	83	38	58.2	1.97	
Salinas *1	67	42	57.7	1.49	
Salton *5	100	55	70.3	1.50	
San Bernardino	89	31	55.2	1.96	
San Jacinto	92	27	56.2	1.97	
San Jose	84	38	58.8	1.66	
San Leandro *1	76	48	58.4	1.88	
San Luis L. H				1.48	
San Mateo *1	77	44	59.2	1.23	
San Miguel *1	84	38	57.0	0.44	
San Miguel Island	72	45	54.9	0.79	
Santa Barbara *a*	73	40	56.0	0.42	
Santa Barbara L. H				0.35	
Santa Clara *a*				1.09	
Santa Cruz *b*	77	32	53.8	2.21	
Santa Cruz L. H				2.34	
Santa Maria	80	32	55.6	0.97	
Santa Monica *1	66	50	57.0	0.10	
Santa Paula	85	41	60.2	0.38	
Santa Rosa *1	74	37	55.8	2.83	
Shasta	88	33	57.7	7.47	
Sierra Madre	81	40	56.0	1.09	
Snedden				0.50	
Sonoma				1.59	
S. E. Farallone L. H				1.70	
Stanford University	76	34	54.0	0.31	
Stockton	70	35	52.8	1.74	
Summerdale	67	20	39.2	5.50	17.0
Susanville	72	25	46.8	0.90	
Tehama *1	82	45	57.8	2.85	
Tejon Ranch	83	38	58.9	1.97	
Thermalito	82	38	57.1	2.72	
Trinidad L. H				5.68	
Truckee *1	66	28	46.0	1.90	12.0
Tulare *b*	92	34	58.0	1.78	
Tulare *c*				1.77	
Ukiah	86	28	53.8	1.91	
Upperlake	86	31	52.8	2.13	
Upper Mattole *1	81	32	50.4	6.51	
Vacaville *a* *1	83	46	58.1	1.39	
Ventura	76	35	54.8	0.38	
Visalia *b*	90	32	57.4	2.22	
Volcano Springs *1	101	52	68.6	T.	
Walnutcreek	80	35	57.4	1.10	
Westpoint				3.94	2.0
West Saticoy				0.15	
Wheatland	81	34	56.0	1.58	
Williams *1	83	43	60.6	1.13	
Wilmington *1	75	49	59.2	0.54	
Wire Bridge *5	81	34	56.6	3.44	
Yerba Buena L. H				1.20	
Yreka	78	22	48.6	0.42	T.
Yuba City *5	85	44	62.2	2.67	
Colorado.					
Arkins				9.21	
Boulder	72	10	45.8	9.18	30.0
Boxelder				6.70	25.0
Breckenridge	45	— 4	23.0	4.82	72.5
Buenavista				1.90	19.0
Canyon	77	13	47.7	6.72	7.5
Castlerock	73	— 3	39.5	7.90	61.0
Cedaredge	76	25	47.4	2.16	5.5
Cheyenne Wells	79	20	48.0	9.95	4.0
Clearview *1	56	2	30.6	7.17	78.0
Collbran				1.78	1.5
Colorado Springs	67	8	41.0	6.78	34.5
Cope	79	18	46.8	11.11	5.0
Cripplecreek	54	0	35.5		62.0
Crook	81	24	48.2	6.42	
Delta	88	27	51.0	1.09	
Dumont				9.23	
Durango	74	17	43.8	2.15	2.0
Fairview	62	— 7	35.0	6.28	64.8
Fort Collins	74	5	43.3	10.56	22.8
Fort Morgan	78	14	47.5	9.98	1.3
Fox				9.58	3.0
Garnett	65	16	39.0	1.24	
Georgetown	63	1	36.2		
Gilman				3.84	47.5
Gleneyrie	67	17	41.7	8.81	48.0
Glenwood				4.00	T.
Grover				6.47	7.5
Gunnison	75	15	41.6	1.57	14.0
Hamps	74	11	44.2	11.30	
Hoehne	77	16	46.2	3.78	8.0
Holly				8.39	
Holyoke	82	20	48.0	5.33	
Hugo				11.95	12.0
Husted	67	0	39.1	10.16	84.0
Lake Moraine	59	— 8	30.0	16.52	141.0
Lamar	84	22	52.0	8.34	7.0
Laporte				10.02	
Las Animas	78	18	48.4	7.54	
Lay	75	12	43.0	0.93	
Leroy	77	17	46.6	7.27	1.0
Longs Peak	63	— 9	31.6	6.34	69.0
Mancos	74	17	42.7	3.97	13.5
Marshall Pass				3.66	41.0
Meeker	75	18	43.7	2.14	1.8
Mitchell				4.07	43.5
Montrose				0.95	
Moraine	62	— 8	35.0	7.74	63.0
Pagoda	75	19	44.6	2.10	
Palmer				10.60	81.0
Parachute	80	29	50.1	2.17	
Perrypark				8.72	
Rangely	79°	16	45.6°	0.79	0.8
Rockyford	79	17	48.8	7.15	
Ruby				3.00	45.0
Saguache	73	18	43.6	2.19	8.0
Salida	73	6	42.2	5.46	11.0
San Luis	71	12	39.9	2.16	21.2
Santa Clara *1	64	19	38.5	8.07	55.0
Sapinero				1.86	5.5
Sargents				2.71	29.0
Seibert				10.67	3.0
Silt	74	24	46.4	1.48	
Sprinfield				12.77	6.0
Strickler Tunnel				14.30	161.0
Trinidad	73	10	45.4	4.18	8.0
Troutvale	58	— 5	31.4	2.57	28.5
T. S. Ranch	75	29	48.6	1.69	
Twinlakes				3.00	30.0
Vilas				6.91	0.5
Wagon Wheel	65	10	34.0	2.20	22.0
Walden	64	4	37.4	1.87	17.2
Wallet				6.62	4.0
Westcliffe	63	3	36.2	3.60	36.0
Wray	82	21	49.4	6.00	2.5
Yuma				8.67	1.5
Connecticut.					
Bridgeport	78	25	48.9	2.41	
Canton	78	19	45.8	1.64	T.
Colchester	77	22	47.6	1.94	
Falls Village				1.69	
Greenfield Hill				2.14	T.
Hartford *b*	76	27	48.4	1.89	
Hawleyville	76	20	46.8	1.90	
Lake Konomoc				2.59	
Middletown	78	22	48.7	2.39	
New London	72	30	49.2	2.07	T.
North Grosvenor Dale	79	21	46.5	2.75	
Norwalk	76	21	47.8	1.95	
Southington	77	23	46.7	1.60	
Storrs	78	20	45.9	2.67	
Voluntown	73	23	46.8	2.43	
Wallingford				1.93	
Waterbury	79	22	48.4	2.23	
West Cornwall	74	21	43.8	1.95	
West Simsbury				1.68	T.
Winsted *1	77	26	44.2		
Delaware.					
Millsboro	76	29	52.4	2.45	
Newark	77	25	51.5	2.19	
Seaford	79	30	54.2	2.43	
Wyoming	85	24	54.6	2.48	T.
District of Columbia.					
Receiving Reservoir *5	82	34	55.3	1.84	
West Washington	82	28	54.9	1.94	T.
Florida.					
Archer	93[d]	35[d]	68.4[d]	7.68	
Bartow	91	39	71.3	3.83	
Brooksville	89	40	70.1	8.05	
Carrabelle	85	40	67.2	5.27	
Clermont	93	44	72.6	2.25	
Dalkeith	87	40	67.8	3.08	
De Funiak Springs	92	35	67.6	3.90	
Deland	88	33	68.8		
Ernestville	93	43	72.2	4.85	
Eustis	93	42	72.0	5.86	
Federal Point	86	38	68.4	5.18	
Fort George *1	84	46	69.5		
Fort Meade	90	40	71.4	3.57	
Gainesville	89	41[k]	70.8[f]	7.83	
Homeland	92°	39°	71.2°		
Huntington	90	41	68.8	2.56	
Hypoluxo	87	53	75.0	1.18	
Inverness		35		6.43	
Jasper	87	39	68.1	4.00	
Kissimmee	88	43	71.3	3.02	
Lake City	89	37	69.3	6.40	
Lemon City	86	54	74.2	6.45	
Macclenny		37		8.15	
Manatee	89	39	69.2	3.20	
Merritt Island	86	50	72.1	1.57	
Middleburg	86	42	68.5	13.05	
Myers	88	50	72.0	2.87	
New Smyrna	89	39	68.2	2.00	
Nocatee	93	45	73.8	3.58	
Ocala	92	36	71.0	7.26	
Orange City	90	38	71.1	2.08	
Orlando	87	42	70.4	3.39	
Plant City	92	38	71.2	4.52	
St. Andrews	90	36	67.0	1.53	
St. Francis	86	35	68.5	2.62	
Sebastian	89	50	71.6	0.75	
Stephensville *1	88	44	67.8	3.76	
Switzerland *1	86	42	67.8	9.25	
Tallahassee	85	38	67.2	4.05	
Tarpon Springs	86	38	68.7	3.52	
Wausau	90	36	65.0	3.90	
Georgia.					
Adairsville	84°	30°	59.4°	6.57	
Albany	91	41	69.4	4.94	
Allentown	90	29	66.5	4.10	
Americus	88	31	65.8	3.26	
Athens *b*	83	29	61.6	7.76	
Bellville				8.77	
Canton				4.64	
Carlton				5.50	
Cedartown	83	37	61.6	6.20	
Clayton	84	33	57.4	7.82	
Columbus	85	35	65.0	5.00	
Covington	90°	32[d]	65.4[d]	7.54	
Dahlonega	85	23	58.9	6.72	
Diamond	84	28	58.0	7.69	T.
Dublin				2.77	
Elberton	85	30	63.0	5.31	
Fitzgerald	89	35	67.1	4.23	
Fleming	90	32	66.0	7.15	
Forsyth	88	32	65.0	4.67	
Fort Gaines	87	34	65.8	4.59	
Franklin	84	33	64.4	4.04	
Gainesville	80	27	59.2	5.76	
Gillsville	86	30	60.3	8.10	
Greenbush	85	25	60.8	7.12	
Harrison	88	30	65.9	3.96	
Hawkinsville				3.61	
Jesup	86	36	67.4	4.47	
Lost Mountain	85	28	62.8	6.16	
Louisville	89	32	66.3	4.75	
Lumpkin	86	34	67.2	6.28	
Marshallville	88	32	67.8	4.02	
Mauzy	89	32	67.2	3.22	
Morgan	88	35	64.5	4.59	
Naylor	87	34	67.4	6.95	
Newnan	83	30	61.3	4.98	
Oakdale				6.66	
Pelham				3.96	
Piscola	80[c]	37	69.6[d]	5.20	
Point Peter	88	28	59.2	6.27	
Poulan	86	35	65.6	4.41	
Putnam	88	31	65.6	5.15	
Quitman	89	34	67.1	6.05	
Ramsey	83	25	60.4	6.93	
Resaca				7.03	
Reynolds				8.56	
Rome	84	30	61.7	7.33	
Talbotton	86	28	64.4	5.02	
Thomasville	87	37	67.8	3.76	
Toccoa	88	33	62.6	10.50	
Valona	90	40	68.4	6.08	
Washington				8.90	
Waycross	90	37	67.6	5.50	
Westpoint				4.31	
Whiteoak	85	38	67.3	7.68	
Idaho.					
Albion	79	24	45.8	3.63	1.0
American Falls	77	21	44.5	4.27	
Atlanta	64	20	42.3	1.72	7.5
Blackfoot	76	24	45.3	1.74	10.0
Burnside	69[d]	30[d]	48.8[d]	1.81	
Challis	79	27	49.7	0.53	
Chesterfield	72	21	40.8	3.07	15.0
Downey	75	21	44.7	3.80	5.5
Fort Sherman	82	25	49.2	1.67	
Forney	78	22	41.8	1.45	1.0
Garnet	84	29	55.2	1.95	
Hagerman	90	27	53.2	0.91	
Halley	76	24	47.9	1.31	T.
Idaho City	80[b]	24[b]	47.3[b]	1.91	
Kootenai	65	25	48.4	0.00	
Lake	56	26	36.8	1.80	18.6
Lakeview	81	28	49.6	1.20	
Lewiston	80	34	53.4	2.02	
Lost River	72	24	45.6	0.85	T.

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Idaho—Cont'd.	°	°	°	*Ins.*	*Ins.*
Marysville [4]	72	20	43.2	1.87	.....
Moscow	76	25	48.6	2.08	3.0
Murray	76	26	48.0	1.39	T.
Oakley	85	26	46.8	2.60	2.0
Ola	80	28	50.6	2.50	
Paris	74	21	42.7	2.98	
Payette	80	28	55.0	1.40	
Pollock	79	31	51.4	1.83	
Priest River	81	28	49.2	1.27	0.7
St. Maries [4]	79	30	49.6	1.44	0.5
Salubria	77	27	50.1	2.68	4.2
Soldier	72	22	44.1	1.75	1.8
Swan Valley	78	23	44.6	1.36	8.1
Weston	76	27	47.2	3.42	T.
Illinois.					
Albion	83	26	56.4	1.55	T.
Alexander	84	26	54.6	1.13	1.0
Ashton	82	25	50.0	1.45	4.5
Astoria	82	26	53.3	1.09	0.8
Aurora *a*	84	26	50.4	0.78	1.8
Beardstown	.....	.....	.....	0.79	T.
Bloomington	87	25	54.0	1.85	1.5
Bushnell	86	26	54.8	1.94	.....
Cambridge	81	27	51.8	1.74	3.0
Carlinville	85	27	55.6	1.36	1.5
Centralia	87	28	57.0	1.33	T.
Charleston	84	26	54.4	1.79	2.0
Chemung	81	24	48.2	1.36	6.5
Chester	.....	.....	.....	3.43	
Cisne	84	22	55.3	1.17	T.
Coatsburg	84	28	55.0	1.26	1.0
Cobden	82	28	57.4	2.70	
Danville	84	22	52.2	1.02	T.
Decatur	86	23	54.1	1.46	2.0
Dixon	85	27	50.8	1.32	3.0
Dwight	84	24	50.8	1.09	2.0
Effingham	82	27	55.6	0.89	1.0
Elgin	81	26	49.4	1.34	3.2
Equality	83	31	57.1	1.87	T.
Flora	83	27	55.8	1.36	T.
Friendgrove [*1]	84	32	58.6	1.02	.....
Galva	82	25	51.8	1.35	2.0
Grafton	.....	.....	.....	2.08	
Grayville	85	30	58.3	1.40	T.
Greenville	88	29	56.8	2.27	
Griggsville	85	30	56.2	1.81	3.2
Halfway	80	30	57.0	1.91	
Halliday	82	21	53.6	2.54	
Havana	88	15	47.8	1.01	0.5
Henry	83	24	52.3	1.68	2.5
Hillsboro	80	27	54.9	1.31	0.8
Joliet	80	25	49.1	0.79	2.0
Kishwaukee	82	25	50.0	2.90	6.0
Knoxville	82	25	51.1	1.22	1.2
Lagrange	82	27	49.8	0.95	2.0
Laharpe	83	27	54.2	1.52	2.0
Lakeville	77	24	46.5	1.57	7.5
Lanark	82	21	49.2	2.36	5.1
Loami	.....	.....	.....	1.21	1.5
McLeansboro	84	30	56.4	2.08	T.
Martinsville	82	29	54.7	0.75	1.0
Martinton	83	26	50.6	1.31	
Mascoutah	.....	.....	.....	1.80	0.2
Mattoon	80	28	56.7	1.04	0.8
Minonk	83	26	51.0	1.16	3.0
Monmouth	85	26	52.2	1.01	1.5
Monticello	84	24	52.6	0.38	2.0
Morrisonville	84	27	53.8	1.16	1.0
Mount Carmel	.....	.....	.....	1.11	T.
Mount Pulaski	86	26	54.7	1.19	2.0
Mount Vernon	80	26	53.4	1.48	
New Burnside	84	29	57.8	2.08	T.
Olney	83	28	55.4	1.21	0.4
Ottawa	86	26	52.6	1.53	2.0
Palestine	85	26	55.9	1.47	T.
Pana	80	26	53.9	1.32	0.5
Paris	83	27	53.2	2.05	
Peoria *a*	.....	.....	.....	1.20	.....
Peoria *b*	85	29	54.7	1.09	0.8
Philo	85	24	52.0	0.82	2.0
Plumhill	82	29	55.8	2.20	T.
Rantoul	84	26	51.9	0.92	2.2
Raum	81	31	59.3	2.62	
Riley	83	25	49.2	1.36	4.3
Robinson	83	29	54.5	1.11	T.
Rockford	83	26	51.2	2.74	4.0
Roundgrove	81	25	50.9	3.95	3.0
St. John	88	29	57.1	2.59	
Scales Mound	81	19	49.3	1.67	4.0
Shobonier	86	28	56.4	1.05	T.
Strawn	83	26	51.7	1.12	2.0
Streator	83	25	50.8	1.24	T.
Sullivan	85	24	54.0	1.03	2.0
Sycamore	81	25	49.2	1.15	4.1
Tilden	82	29	56.0	2.37	T.
Tiskilwa	82	26	51.0	1.72	1.5
Illinois—Cont'd.					
Tuscola	86	24	53.2	1.13	1.5
Walnut	84	26	53.2	1.35	3.1
Wheaton [*5]	84	31	51.1	0.93	5.0
Winchester	84	28	54.6	1.31	0.5
Winnebago	82	23	50.0	2.98	4.0
Yorkville	82	23	49.2	0.79	1.5
Zion	83	26	51.0	1.82	.....
Indiana.					
Angola	79	23	48.8	2.21	7.0
Auburn	83	22	49.4	1.98	
Bloomington	83	28	52.8	1.14	T.
Bluffton	82	20	50.5	2.92	T.
Boonville	86	28	53.4	1.20	
Butlerville	81	25	53.8	2.25	
Cambridge City	80	22	50.0	1.67	T.
Columbus	82	24	51.4	1.79	
Connersville	81	24	51.4	2.40	T.
Crawfordsville	86	28	54.8	1.12	4.2
Delphi	84	22	51.2	1.59	1.0
Edwardsville	.....	.....	.....	2.32	T.
Fairmount	88	21	50.8	2.88	T.
Farmland	80	24	49.2	2.58	1.0
Fort Wayne	82	22	51.4	2.26	3.0
Franklin [*1]	82	32	54.3	1.20	0.5
Greencastle	80	27	53.0	0.72	0.2
Greensburg	88	27	52.4	2.23	T.
Hammond	79	27	45.8	1.55	6.0
Hector	80	22	50.2	1.55	T.
Huntington	82	25	50.8	1.88	5.5
Jeffersonville	81	30	55.8	2.09	
Knightstown	84	24	51.4	2.41	T.
Kokomo	84	26	53.2	1.34	1.0
Lafayette	82	23	51.8	1.03	1.0
Laporte	84	22	52.0	1.29	3.1
Logansport	82	27	51.4	1.42	
Madison *a*	85	25	55.3	2.54	
Madison *b*	.....	.....	.....	1.41	
Marengo	83	25	54.3	2.03	T.
Marion	81	23	51.5	1.97	1.5
Markle	80	21	49.8	1.30	0.5
Mauzy	82	21	51.0	2.19	0.3
Mount Vernon	86	31	56.7	1.47	
Northfield	80	22	50.1	1.37	2.5
Paoli	83	27	55.4	1.56	T.
Prairie Creek	88	23	54.4	0.66	
Richmond	79	21	49.2	1.89	
Rockport	82	25	53.4	1.91	
Rockville	83	22	53.3	1.02	T.
Salem	80	23	52.2	1.78	T.
Scottsburg	84	28	54.6	2.06	T.
Seymour	80	30	54.3	2.20	T.
Shelbyville	82	29	52.7	1.75	T.
South Bend	79	23	50.6	1.17	5.0
Syracuse	82	24	50.9	1.83	6.0
Terre Haute	82	29	54.2	0.88	T.
Topeka	77	22	48.6	1.66	4.2
Valparaiso	86	24	51.7	1.00	T.
Veedersburg	82	24	53.8	0.69	T.
Vevay	81	27	54.9	2.15	
Vincennes	83	29	56.2	1.37	
Washington	.....	28	.....	1.18	
Winamac	81	21	52.1	1.40	
Worthington	86	25	54.0	0.80	T.
Indian Territory.					
Hartshorne	89	33	65.1	1.72	T.
Healdton	86	31	62.0	9.55	
Lehigh	88	30	64.2	3.63	
Muscogee	85	31	62.2	3.52	
Pauls Valley	84	32	62.7	6.03	
Ryan	86	34	63.9	4.71	
South McAlester	.....	.....	.....	2.52	T.
Tahlequah	84	39	62.0	4.55	
Tulsa	.....	.....	.....	2.47	
Wagoner	89	30	62.8	3.61	
Webbers Falls	88	32	63.8	2.84	
Iowa.					
Afton	83	23	54.2	3.39	T.
Albia	82	21	52.8	3.04	1.0
Algona [*1]	78	28	51.8	2.12	2.0
Alta *a*	82	23	51.4	2.19	0.5
Amana	80	27	52.2	3.57	T.
Ames *b*	.....	27	.....	2.61	.....
Ames (near)	.....	.....	.....	3.28	0.5
Atlantic	82	24	52.6	2.33	
Audubon	80	23	52.2	2.95	
Bancroft	80	24	50.5	1.50	1.0
Batavia	.....	.....	.....	0.43	1.0
Baxter	82	26	53.2	4.06	
Bedford	84	25	53.6	2.68	
Belknap	82	27	54.2	2.65	3.0
Belleplaine	84	26	52.0	4.10	2.0
Bonaparte	84	27	53.7	2.16	2.0
Britt	84	25	50.6	1.56	1.2
Buckingham	.....	.....	.....	3.32	
Bussey	.....	.....	.....	2.79	
Carroll	82	20	52.5	4.50	
Iowa—Cont'd.					
Cedarfalls	81	24	51.4	2.50	T.
Cedar Rapids	84	28	54.2	3.62	.....
Centerville	81	25	54.3	1.39	1.0
Chariton	79	24	53.7	2.95	T.
Charles City	83	25	50.2	2.78	2.0
Chillicothe	.....	.....	.....	2.10	
Clarinda	84	26	55.2	2.48	T.
Clearlake	80	25	50.6	2.25	
Clinton	86	24	50.8	2.24	2.0
College Springs	82	24	54.4	3.75	
Coon Rapids	77	23	52.0	3.43	T.
Corning	81	22	53.1	1.79	T.
Council Bluffs	81	26	54.5	3.03	
Cresco	80	25	49.7	2.14	2.5
Cumberland	.....	.....	.....	1.91	T.
Danville	.....	.....	.....	3.01	0.1
Decorah	82	23	50.2	2.32	3.0
Delaware	80	24	49.9	4.42	2.0
Denison	79	23	54.0	2.83	T.
Desoto	84	25	54.0	2.88	0.3
Dows	82	26	51.4	1.56	0.2
Eldon	86	25	54.8	2.61	1.8
Elkader	83	23	50.8	3.28	3.0
Emerson	.....	.....	.....	2.23	
Emmetsburg	.....	.....	.....	1.53	
Estherville	80	24	50.2	2.16	4.0
Fairfield	82	27	54.0	3.79	2.0
Fayette	79	22	49.6	2.63	2.0
Fonda	81	24	52.0	4.73	1.1
Forest City	82	26	50.8	1.55	0.5
Fort Dodge	81	22	51.8	4.04	T.
Fort Madison	.....	.....	.....	2.13	1.0
Galva	83	23	52.7	2.20	
Gilman	.....	.....	.....	1.84	T.
Gladbrook	.....	.....	.....	1.62	0.8
Glenwood	80	25	54.8	2.87	T.
Grand Meadow [*1]	80	26	49.9	2.74	2.0
Greene	85	25	52.0	2.19	.....
Greenfield	87	23	54.1	2.96	T.
Grinnell	77	28	52.8	2.88	
Grinnell (near)	80	27	52.6	2.53	.....
Grundy Center	82	25	51.1	3.63	2.0
Guthrie Center	79	21	52.6	1.92	T.
Hamburg	.....	.....	.....	4.58	
Hampton	89	26	52.3	2.21	1.0
Harlan	81	23	52.4	4.67	T.
Hawkeye	.....	.....	.....	4.11	4.5
Hedrick	85	26	54.2	3.20	.....
Hopeville	80	23	54.0	2.50	
Hoprig	.....	.....	.....	1.24	1.0
Humboldt	81	25	52.6	2.75	
Independence	78	24	50.1	3.37	4.0
Indianola	81	27	55.0	1.98	0.1
Iowa City	83	27	53.2	3.31	1.5
Keosauqua	84	26	54.9	2.74	4.0
Knoxville	83	27	55.0	1.43	T.
Lacona	.....	.....	.....	2.28	
Lansing	83	25	51.8	2.84	3.4
Larchwood	78	24	51.6	2.80	
Larrabee	83	21	49.6	2.67	1.2
Leclaire	.....	.....	.....	3.24	1.0
Lemars	76	23	51.3	4.61	T.
Lenox	80	24	53.8	2.14	T.
Logan	78	23	51.2	3.50	
Maple Valley	.....	.....	.....	1.80	1.0
Maquoketa	80	20	51.4	1.90	3.5
Marshalltown	82	27	53.6	2.83	
Mason City	82	23	49.6	.....	.....
Melrose	.....	.....	.....	1.75	
Monticello	82	19	53.0	3.23	2.5
Mooar	82	23	50.3	1.72	
Mountayr	82	24	54.4	1.92	T.
Mount Pleasant	85	19	51.8	1.20	0.2
Mount Vernon *a* [*1]	83	28	52.8	3.25	.....
Mount Vernon *b*	85	24	52.9	2.90	2.8
Murray	.....	.....	.....	1.82	
New Hampton	79	24	50.7	2.35	2.0
Newton	81	23	52.8	2.79	1.5
Northwood	85	25	52.9	2.15	.....
Odebolt	82	24	53.4	2.35	0.2
Ogden	80	26	53.4	3.49	0.5
Olin	82	26	50.6	3.27	2.0
Onawa	84	20	54.0	3.22	.....
Osage	80	23	49.5	1.71	1.5
Osceola	80	23	53.8	2.64	T.
Oskaloosa	81	26	53.4	2.79	.....
Ottumwa	83	29	55.4	2.38	0.5
Ovid	81	22	54.4	3.15	T.
Pacific Junction	81	25	53.7	3.44	
Plover	85	20	51.8	1.60	0.8
Primghar	84	20	53.3	2.35	1.0
Redoak	89	28	56.6	2.46	
Ridgeway	81	25	51.2	2.74	3.6
Rockwell City	80	25	52.2	2.15	0.5
Ruthven	78	24	49.2	1.41	
Sac City	80	24	52.4	1.85	0.3

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Scranton	78	26	52.5	4.58	T
Sheldon	76	24	50.4	2.05	1.1
Sibley	80	28	50.6	2.19	1.5
Sigourney	88	25	54.4	3.83	1.0
Sioux Center	75	25	51.0	3.95	1.0
Spencer	78	30	49.4	1.81	1.0
Spirit Lake	84	23	51.6	2.79	1.0
Storm Lake	78	24	51.5	2.33	0.7
Stuart	84	25	50.4	2.73	T.
Thurman	79	26	53.6	6.62	
Toledo	83	26	52.7	2.96	.....
Villisca	87	34	54.9	2.72	
Vinton *1	78	29	51.8	.....	.....
Wapello	84	29	53.6	2.20	1.2
Washington	86	24	52.4	2.50	3.0
Washta	.....	.....	.....	2.52	
Waterloo	80	25	51.5	2.79	
Waverly	81	27	51.6	2.40	.....
Westbend *1	81	27	50.2	1.67	1.0
Westbranch	84	22	52.4	3.59	3.0
Whitten	78	25	50.6	3.85	T.
Wilton Junction	83	26	51.8	2.23	5.0
Winterset	83	24	54.4	2.32	
Woodburn	.....	.....	.....	2.39	0.1
Kansas.					
Abilene	85	27	57.4	2.98	T.
Achilles	80	16	51.4	3.61	2.5
Altoona	.....	.....	.....	2.34	
Anthony	.....	.....	.....	3.35	
Atchison *a*	82	30	56.8	3.73	1.0
Baker	81	28	55.6	5.06	T.
Burlington	84	27	58.0	6.53	.....
Campbell	82	25	56.8	4.06	T.
Coburn *1	82	28	54.9	5.10	
Colby	80	14	49.1	4.95	3.0
Columbus	87	28	59.2	4.24	
Coolidge	84	18	51.3	6.80	7.0
Cunningham	83	27	56.6	3.03	1.0
Delphos	83	24	56.5	3.33	2.0
Dresden	77	18	50.8	4.16	2.0
Ellinwood	81	20	54.6	3.11	3.0
Englewood	87	25	53.4	6.52	0.5
Eureka	.....	.....	.....	3.63	
Eureka Ranch	85	13	53.6	4.29	9.5
Fallriver	85	26	60.2	2.99	
Fort Scott	88	31	58.0	3.55	T.
Frankfort	83	24	55.4	4.57	0.2
Garden City	87	16	54.2	5.30	10.0
Garfield	.....	.....	.....	4.52	4.5
Gove *1	85	30	50.1	4.58	10.0
Grenola	85	27	58.4	4.14	
Hays	82	17	52.4	6.35	7.0
Horton	81	28	56.4	5.09	1.0
Hoxie	.....	.....	.....	3.64	3.0
Hutchinson	85	26	55.8	2.18	1.0
Independence	86	29	60.4	2.61	
Lakin	88	19	52.0	4.47	12.0
Lawrence	82	29	57.6	3.87	T.
Lebanon	81	16	54.4	5.50	
Lebo	83	29	57.6	6.81	1.0
Little River	86	24	54.7	2.20	2.0
Macksville	81	22	54.8	3.66	6.0
McPherson	85	25	57.8	3.62	.....
Madison	84	28	57.9	3.60	.....
Manhattan *b*	84	28	58.4	3.13	.....
Manhattan *c*	85	26	58.0	3.07	0.5
Marion	82	28	57.8	3.20	4.5
Meade	.....	21	.....	4.53	.....
Medicine Lodge	88	29	58.8	4.03	T.
Minneapolis	80	23	55.6	3.52	4.0
Moran	81	29	57.7	3.72	T.
Mounthope *1	81	31	57.5	3.14	.....
Ness City	79	16	52.8	3.66	10.0
Newton	86	26	58.0	4.69	
Norwich	81	29	58.0	3.73	
Oberlin	.....	.....	.....	4.50	3.0
Olathe	85	29	57.1	6.90	T.
Osage City	82	26	57.2	4.34	T.
Ottawa	84	28	55.0	5.96	
Phillipsburg	84	24	50.2	3.93	0.5
Pratt	83	25	55.2	3.71	T.
Rome *1	85	25	58.4	2.81	
Russell	85	20	55.4	3.66	9.0
Salina	84	25	55.9	2.96	5.0
Scott	82	10	51.4	4.26	8.0
Sedan	85	30	58.4	2.10	
Seneca	79	27	55.8	5.67	0.1
Toronto	85	26	57.3	4.22	
Tribune	72	16	49.0	4.93	5.0
Ulysses	.....	.....	.....	3.95	5.0
Valley Falls	83	26	58.0	3.37	0.5
Viroqua	85	20	52.4	6.42	3.0
Wakeeney (near)	.....	.....	.....	5.34	4.5
Wallace *1	86	16	50.3	3.41	5.0
Wamego *1	82	29	56.4	4.22	
Winfield	86	27	60.8	2.89	
Kansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Yates Center	83	24	57.6	4.37	T.
Kentucky.					
Alpha *3	90	32	57.9	2.81	
Bardstown	86	26	55.7	3.34	
Blandville	85	31	58.1	2.94	
Bowling Green	83	30	58.2	2.60	
Burnside	.....	.....	.....	1.37	
Caddo	84	23	51.6	1.10	T.
Canton *1	84	30	60.5	2.08	
Carrollton	82	30	56.2	1.74	
Catlettsburg	81	22	55.0	1.04	
Earlington	86	28	57.5	1.52	T.
Edmonton	87	26	57.0	2.71	
Eubank	85	22	55.2	2.10	
Falmouth	.....	.....	.....	1.54	
Frankfort	79	29	55.6	1.63	
Georgetown	78	27	55.0	.....	
Greensburg	88	24	55.7	2.68	
Henderson	83	31	56.7	1.58	
Hopkinsville	83	26	55.6	2.76	
Irvington	82	29	55.4	2.70	T.
Jackson	82	24	56.0	1.14	
Jackstown	.....	.....	.....	1.18	
Leitchfield	84	26	55.8	3.33	
Loretto	84	22	55.0	2.64	
Marrowbone	82	23	55.4	2.66	
Maysville	88	24	54.5	1.60	T.
Middlesboro	84	15	53.4	.....	
Mount Hermon	81	28	56.6	3.93	
Mount Sterling	81	27	55.1	1.26	
Owensboro	86	30	57.2	2.15	
Owenton	84	25	53.8	2.29	
Paducah *a*	.....	.....	.....	3.22	
Paducah *b*	87	33	60.6	2.87	
Pikeville	85	21	54.6	1.31	
Princeton	83	32	58.2	2.83	
Richmond	83	27	55.4	2.62	
St. John	84	26	55.2	2.56	
Scott	81	24	53.4	1.50	T.
Shelby City	84	24	54.7	2.16	
Shelbyville	85	26	55.4	2.33	
Vanceburg	80	24	52.9	1.25	
Williamsburg	87	27	58.3	2.62	
Louisiana.					
Abbeville	86	42	69.2	8.05	
Alexandria	92	35	68.2	9.37	
Amite	89	35	67.6	17.42	
Bastrop	89	34	66.2	10.55	
Baton Rouge	88	38	68.2	10.85	
Burnside	86	35	67.2	8.00	
Calhoun	86	33	64.8	11.89	
Cheneyville	89	35	67.8	14.36	
Clinton	87	40	68.2	15.97	
Como	90	38	66.0	12.03	
Donaldsonville	85	38	66.2	7.77	
Emilie	87	40	67.0	12.78	
Farmerville	84	33	63.7	12.44	
Franklin	86	40	68.4	11.06	
Grand Coteau	88	40	68.8	7.22	
Hammond	89	35	68.6	10.55	
Houma	87	41	69.5	10.25	
Jeanerette	90	36	68.6	8.25	
Jennings	88	41	67.8	6.55	
Lafayette	88	37	68.0	7.53	
Lake Charles	86	39	67.9	6.13	
Lake Providence	92	38	67.4	10.72	
L'Argent	88	36	64.9	10.45	
Lawrence	85	43	67.4	5.25	
Libertyhill	96	32	66.4	8.64	
Mansfield	88	30	63.8	4.80	
Melville	90	41	67.6	10.98	
Minden	90	32	63.8	2.30	
Monroe	91	40	64.5	8.04	
Montgomery	89	36	66.9	9.16	
New Iberia	86	41	67.0	8.70	
Oakridge	94	33	63.8	11.66	
Opelousas	87	37	67.3	7.44	
Oxford	87	32	65.0	5.30	
Paincourtville	89	39	69.2	8.86	
Plain Dealing	88	30	64.2	4.90	
Prevost	90	39	68.6	11.88	
Robeline	88	41	68.4	11.55	
Ruston	86	34	65.0	12.45	
Schriever	90	38	68.2	9.49	
Shellbeach	85	.....	.....	5.24	
Southern University	89	40	64.1	.....	
Sugar Ex. Station	85	44	67.8	13.03	
Sugartown	85	39	67.1	8.71	
Venice	83	43	67.2	9.53	
Wallace	89	40	68.4	13.78	
White Sulphur Springs	90	36	71.0	15.66	
Maine.					
Belfast *6	77	30	47.2	2.26	T.
Bemis	71	15	38.2	0.38	T.
Calais	76	25	41.6	3.84	T.
Carmel	76	24	45.0	1.91	
Maine—Cont'd.	°	°	°	*Ins.*	*Ins.*
Cornish *1	76	24	43.2	2.17	T.
Fairfield	78	22	43.3	1.63	
Farmington	79	15	42.0	1.74	1.0
Flagstaff	74	12	38.1	0.35	
Gardiner	78	23	44.5	2.50	
Kineo	70	20	37.2	.....	
Lewiston	80	23	43.9	1.92	
Mayfield	77	18	40.8	1.57	5.0
North Bridgton	83	16	43.4	0.96	T.
Orono	78	21	44.1	2.01	
Petit Manan *1	55	29	41.8	.....	
Rumford Falls	68	22	41.4	1.21	T.
Winslow	80	15	43.9	1.95	
Maryland.					
Annapolis	83	33	55.4	3.40	
Bachmans Valley	80	23	50.2	1.79	2.0
Boettcherville	84	25	53.4	0.99	
Boonsboro *a*	85	24	53.1	1.45	1.5
Cambridge	75	32	54.2	2.60	T.
Charlotte Hall	84	27	53.3	3.55	
Chase	77	23	51.8	2.39	T.
Chewsville	80	23	50.8	1.38	
Coleman	86	.....	.....	2.58	
Collegepark	72	27	47.8	1.82	T.
Cumberland	74	31	53.0	0.64	
Darlington	77	26	52.4	2.23	
Deerpark	77	19	46.2	1.41	3.0
Denton	78	26	53.4	0.85	T.
Easton	76	27	53.2	2.69	
Ellicott City	80	24	51.2	1.74	
Fallston	76	23	51.8	2.25	T.
Frederick	83	29	53.7	1.62	1.0
Frostburg	77	23	50.7	2.11	0.5
Grantsville	76	19	45.4	1.05	2.0
Greatfalls	78	26	52.0	2.07	
Greenspring Furnace	85	24	52.6	1.76	T.
Hagerstown	85	26	53.6	1.46	T.
Hancock	86	24	52.6	1.09	T.
Harney	.....	.....	.....	1.10	0.5
Jewell	80	30	54.2	2.74	T.
Johns Hopkins Hospital	83	28	53.0	2.92	
Laurel	83	24	52.8	2.01	
McDonogh	79	26	52.1	1.61	
Mount St. Marys Coll	82	23	51.7	1.20	2.0
Newmarket	83	25	53.2	1.90	T.
Pocomoke	79	32	54.4	1.89	
Prince Fredericktown	82	29	54.2	3.65	
Princess Anne	76	29	52.9	1.98	
Queenstown	75	28	52.8	2.40	T.
Rockhall *a*	76	28	53.1	2.02	T.
Rockhall *b*	76	28	52.9	2.10	
Sandy Point	73	29	53.1	.....	
Sharpsburg	84	27	53.2	1.39	T.
Smithsburg *a*	81	24	51.0	1.39	.....
Smithsburg *b*	82	24	52.4	1.31	T.
Solomons	76	32	53.8	3.35	T.
Sudlersville	78	28	53.9	2.13	T.
Sunnyside	75	16	44.4	1.75	5.2
Takoma Park	83	26	54.6	2.21	
Taneytown	82	24	51.4	1.20	0.2
Van Bibber	75	26	52.6	2.55	T.
Westernport	79	25	48.5	1.47	
Westminster	80	24	52.2	2.06	T.
Woodstock	82	27	53.2	1.57	T.
Massachusetts.					
Amherst	75	20	44.4	1.80	
Attleboro	.....	.....	.....	1.86	
Bedford	81	23	46.1	2.48	
Bluehill (summit)	77	22	44.6	1.98	
Cambridge	81	24	48.2	1.90	
Chestnuthill	81	24	47.0	2.24	
Cohasset	.....	.....	.....	2.01	
Concord	80	23	45.2	1.92	
Dudley *1	78	28	47.7	1.63	
East Templeton *1	74	24	48.2	2.57	T.
Fallriver	72	25	48.0	2.28	
Fitchburg *a* *1	76	26	45.0	2.48	
Fitchburg *b*	79	23	45.7	2.10	
Framingham	80	24	47.6	2.48	
Groton	78	20	44.8	2.05	
Hyannis *1	63	27	44.9	3.43	
Jefferson	.....	.....	.....	3.12	T.
Lawrence	80	19	45.4	1.79	
Leeds	79	18	45.3	1.85	T.
Leominster	.....	.....	.....	2.26	
Longplain	.....	.....	.....	2.32	
Lowell *a*	76	24	45.8	2.16	
Lowell *b*	80	22	45.2	.....	
Ludlow Center	76	14	41.1	1.66	
Middleboro	75	21	45.1	1.67	
Monson	79	22	45.8	2.36	
New Bedford *a*	69	28	47.4	2.66	
Pittsfield	71	22	43.6	2.27	
Plymouth *1	73	32	47.3	2.22	
Princeton	.....	.....	.....	2.58	
Provincetown	70	28	46.2	1.92	

TABLE II.—*Climatological record of voluntary and other cooperating observers.*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Massachusetts*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Salem	.....	.....	.....	2.07	
Somerset *[1]	75	24	48.4	1.79	
South Clinton	.....	.....	.....	3.02	
Springfield Armory	80	26	47.6	1.25	
Sterling	.....	.....	.....	2.33	
Taunton *c*	78	23	45.0	2.16	
Webster	.....	.....	.....	2.55	
Westboro	83	24	49.1	2.08	
Weston	78	25	46.2	2.23	
Williamstown *[1]	74	26	44.6	1.17	
Winchendon	.....	.....	.....	2.05	
Worcester *b*	78	24	46.6	2.56	T.
Michigan.					
Adrian	80	23	48.0	1.85	0.8
Agricultural College	78	23	47.4	2.00	1.0
Allegan	.....	24	.. ..	0.37	1.5
Alma	81	22	48.0	1.96	2.0
Ann Arbor	81	22	48.4	1.43	2.2
Arbela	78	22	46.4	2.32	1.0
Badaxe	78	22	45.6	1.92	
Ball Mountain	80	22	46.8	0.76	0.5
Battlecreek	80	22	48.5	1.96	3.5
Bay City	80	22	45.8	2.07	3.0
Berlin	79	19	45.7	0.99	0.6
Berrien Springs	79	23	48.8	2.00	3.0
Big Point Sable *[2]	70	26	43.8	.....	
Big Rapids	79	20	46.8	2.62	5.0
Boon	76	16	43.4	1.81	4.2
Calumet	75	21	45.4	2.65	T.
Charlevoix	75	18	42.8	2.26	1.0
Cheboygan	76	19	43.0	3.15	T.
Clinton	82	23	48.9	1.62	4.6
Coldwater	.....	.....	.....	1.67	4.0
Dundee	80	24	48.6	1.67	1.0
Eagle Harbor	74	20	41.8	2.39	
East Tawas	79	15	42.2	1.80	2.0
Eloise	81	24	49.0	2.31	T.
Fairview	79	21	48.6	0.98	2.5
Fitchburg	79	21	47.0	0.91	2.5
Flint	78	23	46.6	1.53	
Frankfort	68	24	45.2	1.70	2.0
Gaylord	79	17	44.4	0.70	0.5
Gladwin	80	19	47.6	0.65	3.0
Grand Rapids	80	21	49.8	1.81	3.5
Grape	83	24	48.4	2.06	0.8
Grayling	82	19	45.7	1.15	3.0
Hanover	80	22	47.7	2.07	2.0
Harbor Beach	77	20	48.0	1.65	0.2
Harrisville	75	20	42.2	1.86	
Hart	77	25	47.8	1.67	2.0
Hastings	81	20	47.7	1.41	4.0
Hayes	80	20	44.4	1.11	2.0
Highland Station	.....	.....	.....	2.00	2.0
Hillsdale	79	22	47.6	2.22	2.0
Howell	74	18	47.2	1.30	1.0
Humboldt	79	8	41.8	1.85	T.
Ionia	80	24	47.9	1.15	1.0
Iron Mountain	82	20	47.4	3.18	2.2
Iron River	79	10	42.6	3.20	6.0
Ishpeming	78°	13	43.2°	3.15	6.0
Ivan	78	17	44.8	0.66	11.0
Jackson	83	23	49.5	1.44	2.5
Jeddo	80	22	44.4	1.74	0.5
Kalamazoo	78	21	49.6	2.03	4.0
Lake City	75	15	45.5	1.95	3.0
Lansing	78	24	47.9	2.30	0.8
Lapeer	81	23	48.2	0.88	
Lathrop	82	15	43.2	2.31	1.0
Lincoln	80	20	43.6	0.30	
Ludington	72	24	44.4	.....	
Mackinaw	72	17	40.8	3.15	1.0
Madison	83	23	48.7	1.87	2.5
Mancelona	78	15	45.0	0.90	1.0
Manistee	75	22	45.6	1.50	4.0
Manistique	62	20	40.6	1.97	T.
Middle Island *[2]	64	19	41.8	.....	
Midland	72	20	47.4	0.67	2.0
Mottville	78	22	46.8	1.99	3.2
Mount Clemens	82	22	47.6	0.64	
Mount Pleasant	78	20	46.5	1.36	
Muskegon	79	25	47.6	1.05	2.0
Newberry	80	10	41.1	0.90	
North Marshall	78	24	48.2	0.95	4.0
Northport	72	22	45.1	1.93	2.5
Old Mission	77	21	46.4	2.19	
Olivet	76	22	47.7	1.75	3.0
Ovid	81	22	47.6	1.58	4.0
Owosso	81	20	47.2	1.44	0.5
Petoskey	73°	18°	44.4°	2.09	0.5
Plymouth	82	.....	.....	0.83	0.5
Port Austin	80	22	43.6	1.09	T.
Reed City	76°	21°	48.8°	1.94	2.4
Roscommon	80	17	45.7	1.35	4.0
Saginaw	81	24	48.1	2.24	2.5
St. Ignace	72	20	43.4	1.89	T.
St. Johns	80	20	48.4	1.55	1.5
***Michigan*—Cont'd.**					
St. Joseph	76	20	48.4	1.45	3.5
Sidnaw	85	20	45.6	2.22	1.5
Somerset	78	22	47.4	2.46	2.0
South Haven	73	31	49.5	1.76	2.0
Stanton	82	21	51.5	1.30	2.0
Thomaston	93	6	44.1	.....	
Thornville	79	25	48.2	1.35	2.5
Traverse City	80	22	44.0	1.22	2.0
Vandalia	80	22	49.0	1.86	4.8
Vassar	79	24	46.0	1.92	0.4
Vermilion Point	75	18	40.2	.....	.....
Wasepi	80	22	47.8	1.50	3.0
West Branch	79	16	45.4	1.30	3.5
Wetmore	79	6	41.0	0.72	1.0
Whitecloud	80	22	47.7	2.30	3.0
Whitefish Point	71	14	40.4	2.44	.....
Williamston	79	23	49.0	1.94	3.0
Ypsilanti	79	22	47.4	2.15	1.0
Minnesota.					
Ada	85	19	49.8	1.09	
Albert Lea	76	24	48.7	1.70	
Alexandria	76	21	48.6	0.28	
Ashby	81	22	50.6	1.15	0.2
Beardsley	80	23	48.5	0.30	T.
Bemidji	80	17	48.4	1.13	
Bird Island	79	23	50.5	1.78	T.
Blooming Prairie	85	23	49.6	1.51	0.5
Brainerd	80	19	48.8	0.77	
Caledonia	80	24	49.4	2.86	3.0
Camden	82	19	50.8	1.50	T.
Campbell	80	18	46.4	1.12	.....
Collegeville	78	25	51.1	1.00	0.8
Crookston	83	23	51.5	1.59	
Currie [4]	80[4]	24[4]	50.6[4]	1.90	
Deephaven	.....	.....	.....	2.29	0.1
Detroit City	80	19	47.6	1.29	T.
Faribault	82	21	51.4	0.52	0.7
Farmington	84	19	48.3	2.64	3.0
Fergus Falls	77	22	50.0	1.43	0.7
Glencoe	79	21	49.8	1.75	
Grand Meadow	82	24	50.6	2.19	1.2
Granite Falls	80	24	49.8	2.15	
Hallock	90	18	50.2	0.82	
Koochiching	84	12	45.0	0.65	
Lake City	82	18	50.0	2.15	1.0
Lakeside	78	25	50.6	1.31	T.
Lake Winnibigoshish	80	20	47.6	0.45	
Leech [1]	81	20*	46.8	0.40	
Long Prairie	79	19	48.8	1.09	T.
Luverne	82	25	50.0	3.25	0.2
Lynd	80	21	49.1	1.33	
Mapleplain	83	22	51.4	1.82	1.1
Milaca	83	19	49.6	0.50	
Milan	80	25	51.8	1.42	0.2
Minneapolis *a*	82	22	50.7	2.06	1.2
Minneapolis *b* [1]	82*	21	50.7	1.98	1.5
Minnesota City	.....	.....	.....	1.84	4.0
Montevideo	83	22	50.2	1.86	T.
Morris	79	24	50.6	0.70	
Mount Iron	86	16	45.4	0.55	T.
Newfolden	82	20	48.0	1.61	
New London	78	22	49.0	0.64	
New Richland *[1]	82	27	50.4	.....	
New Ulm	83	26	51.8	2.45	1.0
Park Rapids	78	19	47.2	1.10	0.6
Pine River	78	17	49.0	0.45	
Pipestone	74	21	48.9	2.76	0.5
Pleasant Mounds	81	26	51.4	2.20	2.0
Pokegama Falls	82	14	47.4	0.44	.....
Redwing	.....	.....	.....	1.83	2.5
Reeds	.....	.....	.....	2.42	4.8
Rolling Green	78	25	50.3	1.56	1.0
St. Charles	79	23	50.1	2.51	4.0
St. Cloud	80	24	51.4	0.81	
St. Peter	79	29	51.6	1.32	T.
Sandy Lake Dam	79	17	47.8	0.34	1.0
Shakopee	81	23	51.8	2.15	2.0
Tower	83	15	49.0	0.80	.....
Two Harbors	70	18	39.2	0.56	T.
Wabasha *[1]	81	27	51.4	2.52	3.0
Willmar	76	23	50.3	1.12	T.
Willow River	85	13	46.0	0.61	0.5
Winnebago City	81	21	50.5	2.25	.....
Worthington	77	24	50.4	2.91	1.5
Zumbrota [1]	82*	22	50.2	.....	.....
Mississippi.					
Aberdeen	84	30	60.6	6.90	
Agricultural College	88	38	64.7	11.90	
Americus	89	34	67.6	7.74	
Austin	85	33	61.7	4.82	
Batesville	84	31	59.8	7.72	
Bay St. Louis	84	43	66.6	16.83	
Biloxi	87	42	67.6	10.22	
Booneville	83	37	61.1	8.18	
Canton	86	32	65.0	15.71	
Columbus *b*	84	32	62.7	11.08	
***Mississippi*—Cont'd.**					
Crystalsprings	89	33	65.8	12.86	
Edwards	88	36	66.9	12.66	
Fayette	86	33	65.0	16.98	
Fayette (near) *[1]	88	40	69.0	.....	
Greenville *a*	85	38	64.8	6.99	
Greenville *b*	88	35	64.4	7.11	
Hattiesburg	88	36	66.4	14.85	
Hernando	84	34	62.2	7.55	
Holly Springs	84	35	60.6	8.44	
Kosciusko	87	31	64.5	10.50	
Lake	85	28	61.8	10.15	
Leaksville	93	35	66.9	8.09	
Logtown	86	35	67.2	17.26	
Louisville	86	27	61.8	13.40	
Macon	87	30	64.6	10.48	
Magnolia	89	34	67.8	18.20	
Natchez	90	36	68.0	19.15	
Okolona	89	30	62.2	5.51	
Palo Alto	84	33	64.3	9.70	
Pontotoc	86	32	63.2	6.97	
Port Gibson	90	32	63.3	12.86	
Ripley	85	27	61.6	8.47	
Stonington *[1]	84	38	66.9	.....	
Tupelo	.....	.....	.....	8.26	
Walnutgrove	86	43	67.8	13.10	
Waynesboro	86	31	64.8	9.88	
Windham	92	30	67.2	17.66	
Woodville	88	37	67.2	15.29	
Yazoo City	91	35	65.6	9.85	
Missouri.					
Appleton City	89	30	59.1	3.81	T.
Arlington	.....	.....	.....	5.15	T.
Arthur *[3]	.....	34	56.4	3.80	T.
Avalon	82	27	56.4	2.78	1.0
Bagnell	.....	.....	.....	4.21	
Bethany	81	26	55.6	3.80	0.5
Birchtree	85	26	58.0	4.30	
Boonville	.....	.....	.....	6.04	4.0
Brunswick	81	25	55.5	3.38	1.5
Carrollton	83	29	56.3	2.45	T.
Conception	80	28	55.4	2.98	
Cook Station	85	22	56.2	3.95	
Cowgill *[5]	84	30	57.1	3.15	
Darksville	81	25	53.3	3.30	2.0
Downing	.....	.....	.....	2.80	2.0
East Lynne *[3]	.....	31	54.4	4.25	T.
Edgehill *[5]	80	28	54.3	3.43	
Edwards	88	29	57.6	2.35	T.
Eldon	82	29	56.1	3.81	2.0
Elmira	86	29	56.0	.....	.....
Fairport	.....	.....	.....	4.71	1.2
Fayette	85	30	56.6	2.68	1.5
Fulton	88	25	55.8	5.13	3.0
Galena	.....	.....	.....	3.44	
Gallatin *[1]	84	30	56.8	2.57	1.2
Gayoso	88	30	61.2	3.82	
Glasgow	84	28	56.8	2.68	
Gorin	.....	.....	.....	3.80	2.0
Halfway	83	25	58.8	5.50	T.
Harrisonville	85	29	56.4	3.66	0.2
Hazlehurst	.....	.....	.....	2.29	1.0
Hermann	.....	.....	.....	2.79	0.1
Houston	86	26	56.7	3.84	T
Houstonia (near)	.....	.....	.....	2.96	4.0
Irena	.....	.....	.....	2.16	T.
Ironton	84	24	54.4	3.47	T.
Jackson *[3]	80	32	55.0	3.15	
Jefferson City	89	28	55.4	3.70	
Kidder	81	28	55.5	3.52	3.3
Lamar	87	30	60.4	4.48	T.
Lamonte	.....	.....	.....	3.18	3.0
Lebanon	84	29	58.8	3.55	
Lexington	86	29	58.4	2.76	T.
Liberty	80	29	56.2	2.99	
Louisiana	87	27	56.0	1.64	0.9
McCune *[1]	85	31	55.7	2.46	2.5
Macon	85	25	56.4	3.40	3.0
Marblehill	84	23	55.6	2.88	
Marshall	82	27	55.2	3.57	2.5
Maryville	82	26	54.3	2.57	T.
Mexico	85	28	56.4	2.66	4.0
Miami *[6]	84	30	56.5	2.71	0.8
Mineralspring	84	24	57.6	3.34	
Montreal	83	28	56.3	4.08	T.
Mount Vernon	86	28	58.1	1.72	T.
Neosho	85	26	59.0	4.32	
Nevada	.....	.....	.....	3.11	
New Haven	85	30	56.6	4.44	1.5
New Madrid	79	34	57.6	3.59	
New Palestine	83	28	56.8	3.44	1.5
Oakfield	83	29	56.6	3.33	T.
Olden	79	24	56.5	3.92	T
Oregon *a*	82	30	57.2	4.09	0.1
Oregon *b*	82	28	57.9	3.79	0.1
Palmyra *[5]	82	28	56.8	1.37	2.0
Phillipsburg *[1]	81	30	56.9	2.98	T.

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Pickering *2	78	26	49.2	3.08	T.
Poplarbluff	87	28	61.1	4.85	
Potosi	84	21	53.5	3.99	T.
Princeton	82	24	54.8	2.73	
Richmond	81	31	57.1	3.37	0.5
Rockport	.....	.....	.....	5.90	
Rolla	.....	.....	.....	5.25	T.
St. Charles	85	28	55.4	2.60	T.
St. Joseph	.....	.....	.....	2.74	0.5
Sarcoxie *2	.....	30	55.2	3.13	0.3
Sedalia	84	28	55.4	2.60	2.0
Seymour	83	23	56.5	3.44	T.
Shelbina	.....	.....	.....	3.30	2.0
Sikeston	83	29	57.6	3.20	
Steffenville	85	27	55.6	1.97	3.0
Sublett	82	23	53.9	4.30	1.0
Trenton	78	29	54.8	2.41	1.5
Unionville	86	24	55.7	3.32	
Vichy	82	28	57.4	4.17	T.
Warrensburg	85	29	57.0	3.50	2.0
Warrenton	85	28	54.8	3.17	1.3
Wheatland	.....	.....	.....	6.76	0.5
Willowsprings	84	22	57.6	3.69	
Windsor	83	29	57.1	3.15	1.0
Wylie	89	26	61.5	3.85	
Zeitonia	85	26	56.9	5.09	
Montana.					
Adel	70	20	41.7	2.52	4.0
Billings	77	29	48.3	.....	.....
Boulder	75	19	44.2	1.59	T.
Bozeman	70	26	43.4	3.24	
Butte	68	24	44.8	2.75	
Canyon Ferry	80	26	50.4	1.07	
Chinook	78	21	49.2	1.05	
Columbia Falls	75	25	48.8	1.44	
Corvallis	74	27	46.5	1.45	1.5
Crow Agency	79	22	50.2	3.99	5.0
Dearborn Canyon	71	25	45.5	3.37	.....
Dell	69	21	41.6	2.58	24.0
Dillon	71	25	45.9	2.27	11.2
Ekalaka	86	16	48.3	0.96	1.0
Fort Logan	80	18	42.8	1.33	.....
Glasgow	81	18	51.2	1.16	
Glendive	88	23	54.2	0.59	2.0
Glenwood	74	24	44.4	1.10	.....
Greatfalls	76	29	49.0	1.39	0.1
Kipp	73	17	44.0	1.52	7.4
Lewiston	76	18	46.3	.....	.....
Manhattan	75	20	47.2	1.11	0.5
Martinsdale	74	24	45.2	4.75	
Marysville	68	23	42.6	1.95	3.0
Missoula	78	29	50.6	1.02	
Ovando	73	21	45.9	0.77	.....
Parrot	74	26	46.4	2.68	1.5
Plains	73	24	49.6	1.25	
Poplar	80	19	51.0	1.27	.....
Redlodge	68	18	42.0	7.90	31.0
Ridge	85	17	48.2	2.64	2.0
Troy	85	27	50.8	0.90	
Twin Bridges	72	26	45.3	.....	
Utica	80	22	45.8	2.85	.....
Yale	74	21	44.4	2.99	2.0
Nebraska.					
Agate	.....	.....	.....	4.33	5.0
Agee	.....	.....	.....	5.90	
Albion	76[f]	21	54.0[d]	5.19	
Alliance	.....	.....	.....	3.08	1.0
Alma	84	25	54.0	3.84	0.5
Ansley	78	20	50.2	4.55	T.
Arborville *1	80	24	52.0	6.14	
Ashland *a*	80	24	54.6	3.87	
Ashland *b* *1	80	27	52.9	4.06	T.
Ashton	.....	.....	.....	4.84	
Auburn	80	26	55.4	7.29	
Aurora *1	74	33	53.5	6.70	
Bartley	.....	.....	.....	3.79	.....
Beatrice	80	25	55.0	4.09	T.
Beaver	83	22	53.3	4.87	1.0
Bellevue	.....	.....	.....	3.12	T.
Benedict	.....	.....	.....	6.97	
Benkleman	.....	.....	.....	3.43	
Blair	79	23	52.8	5.35	T.
Bluehill	.....	.....	.....	5.07	
Brokenbow *1	70	26	49.1	6.17	
Burchard	.....	.....	.....	4.73	
Burwell	.....	.....	.....	5.39	2.0
Callaway	72	24	48.9	4.50	
Camp Clarke	79	18	47.8	5.84	T.
Central City	.....	.....	.....	5.43	
Chester	.....	.....	.....	5.16	
Cody	.....	.....	.....	4.90	
Columbus	79	23	51.8	4.65	
Crete	76	15	50.2	5.64	
Culbertson	.....	.....	.....	3.25	2.0
Curtis	76	25	55.1	3.13	.....
David City	78	22	53.2	6.00	T.
Dawson	81	27	57.2	7.37	T.
Edgar *a*	.....	.....	.....	7.04	
Ericson	.....	.....	.....	3.89	
Ewing	.....	.....	.....	6.28	0.2
Fairbury	84	24	54.8	4.63	
Fairfield	83	24	55.7	9.44	
Fairmont	80	23	52.6	9.07	
Fort Robinson	78	20	47.8	4.10	7.0
Franklin	87	22	55.0	5.57	
Fremont	80	22	53.6	3.75	T.
Geneva	81	24	53.7	7.55	
Genoa	77	24	53.4	5.87	
Gering	80	23	46.8	4.16	1.0
Gordon	.....	.....	.....	2.60	
Gothenburg	.....	.....	.....	4.43	
Grand Island *a*	.....	.....	.....	5.39	
Grand Island *b*	79	22	53.4	6.08	
Grand Island *c*	79	22	53.2	5.59	
Greeley	.....	.....	.....	5.75	T.
Halgler	.....	.....	.....	6.05	3.0
Hartington	77	20	51.0	4.48	0.5
Harvard	76	24	52.8	5.98	
Hastings *1	74	29	53.3	5.74	
Hayes Center	.....	.....	.....	3.07	1.5
Hay Springs	78	21	47.2	3.91	2.0
Hebron	82	25	54.4	6.60	
Hickman	.....	.....	.....	5.60	
Holdrege	.....	.....	.....	5.84	T.
Hooper *1	80	26	53.2	3.93	T.
Imperial	78	22	50.8	3.96	0.5
Johnstown	.....	.....	.....	4.35	3.5
Kearney	.....	.....	.....	4.92	
Kennedy	80	20	49.6	4.35	2.0
Kimball	74	17	44.5	7.62	4.0
Kirkwood *1	80	27	50.6	5.35	T.
Laclede *a*	76	23	52.6	6.20	
Lincoln *d*	80	20	55.8	4.71	T.
Lodgepole	82	23	49.5	6.07	T.
Loup	.....	.....	.....	4.20	
Lynch	83	18	52.3	4.41	
Lyons	.....	.....	.....	4.82	0.5
McCook	.....	.....	.....	3.37	3.0
McCool	.....	.....	.....	7.31	
Madison	76	21	51.4	5.49	0.8
Madrid *5	75	28	47.4	2.15	
Marquette	.....	.....	.....	5.96	
Mason City	.....	.....	.....	3.19	
Merriman	.....	.....	.....	0.95	
Minden *a*	81	24	53.0	3.96	
Minden *b*	.....	.....	.....	3.85	
Monroe	.....	.....	.....	4.79	T.
Nebraska City *b* *1	.....	.....	.....	5.08	
Nebraska City *c*	80	25	56.4	4.87	T.
Nemaha *1	82	30	55.7	4.90	
Nesbit	75	22	48.8	4.26	0.5
Norfolk	78	20	52.3	4.84	T.
North Loup	76	23	52.2	5.26	
Oakdale	78	23	52.1	5.32	T.
Odell	.....	.....	.....	5.30	
O'Neill	78	19	50.9	5.47	
Ord	.....	.....	.....	4.59	
Osceola	.....	.....	.....	6.36	
Ough	.....	.....	.....	3.87	1.0
Palmer *5	76	30	54.2	4.60	
Palmyra *1	82	26	52.8	4.37	
Plattsmouth *a*	.....	.....	.....	4.69	T.
Plattsmouth *b*	.....	.....	.....	4.81	
Pleasanthill	.....	.....	.....	6.16	
Ravenna *a*	76	22	51.8	3.56	
Ravenna *b*	78	31	54.8	2.84	
Redcloud *b* *1	75	28	54.3	4.45	
Republican *1	80	30	53.3	4.47	
Rulo	.....	.....	.....	5.20	
St. Libory	.....	.....	.....	4.83	
St. Paul	80	22	53.3	3.75	
Salem *1	78	30	57.5	6.27	
Santee	82	24	55.4	4.42	T.
Schuyler	.....	.....	.....	4.74	
Seneca *1	76	20	46.7	2.80	T.
Seward	.....	.....	.....	5.91	
Spragg	.....	.....	.....	6.60	
Springview	76	30	50.6	5.45	
Stanton *1	79	27	50.4	6.10	0.2
State Farm	80	23	54.8	4.70	
Strang	.....	.....	.....	6.76	
Stratton	.....	.....	.....	3.82	
Superior *5	80	26	55.8	7.60	
Syracuse	.....	.....	.....	3.86	
Tablerock	.....	.....	.....	6.25	T.
Tecumseh *b*	81	22	52.2	6.06	
Tecumseh *c*	.....	.....	.....	6.51	
Tekamah	81	24	53.1	4.65	T.
Thedford	.....	.....	.....	3.76	
Turlington	78	24	54.4	4.45	T.
Valparaiso	.....	.....	.....	5.29	
Wakefield	79	20	51.8	5.56	0.3
Wallace	.....	.....	.....	2.47	
Wauneta	.....	.....	.....	2.48	1.0
Weeping Water *1	79	23	50.9	4.20	T.
Westpoint	77	19	54.0	3.43	T.
Whitman	.....	.....	.....	2.00	
Wilber *1	80	30	53.3	5.34	
Willard	.....	.....	.....	3.35	
Wilsonville *1	74	22	51.4	5.95	2.0
Winnebago	.....	.....	.....	3.40	1.00
Wisner	.....	.....	.....	4.88	.....
Wymore *1	79	26	49.8	5.12	
York	.....	.....	.....	7.49	
Nevada.					
Austin	68	11	39.8	2.09	
Belmont	.....	.....	.....	1.49	7.5
Beowawe *1	73	20	42.4	.....	.....
Candelaria	78	18	42.9	0.60	4.7
Carlin *1	75	25	42.9	1.50	8.0
Carson City	75	19	44.2	2.79	13.3
Clover Valley	.....	.....	.....	2.05	
Cranes Ranch	.....	.....	.....	2.09	
Duck Valley	71	18	41.9	2.30	13.5
Elko (near)	68	24	42.8	3.94	.....
Ely	74	13	40.7	5.52	45.0
Empire Ranch	74	20	42.7	2.53	13.2
Fenelon	.....	.....	.....	1.95	15.5
Golconda *1	72	30	49.3	0.15	
Halleck *1	77	26	41.7	1.15	4.0
Hawthorne	76	25	46.7	1.05	
Hot Springs *1	70	32	52.6	.....	
Humboldt *1	82	30	49.9	0.25	
Lee	.....	.....	.....	3.52	20.5
Lewers Ranch	71	17	42.4	4.16	20.9
Los Vegas	80	38	54.8	1.42	
Lovelocks *1	81	31	49.1	0.50	
Martins	75	18	45.6	2.43	T.
Mill City *1	72	28	46.4	.....	
Monitor Mill	69	14	38.6	3.59	36.0
Palisade *1	75	23	49.0	1.25	
Palmetto	75	10	39.6	4.80	31.5
Reno State University	77	22	45.2	1.75	1.0
Sodaville	82	18	47.2	1.62	
Tecoma	.....	.....	.....	3.00	T.
Toano *1	72	28	44.2	1.25	12.5
Tuscarora	70	18	39.6	1.23	6.2
Tybo	71	19	43.1	2.65	
Verdi *1	70	25	41.9	0.20	T.
Wadsworth *1	82	26	48.7	1.92	0.5
Wells	.....	.....	.....	1.17	T.
New Hampshire.					
Alstead	.....	.....	.....	1.48	T.
Berlin Mills	77	8	39.5	0.71	
Bethlehem	74	14	41.3	1.45	1.0
Brookline *1	82	28	48.2	1.98	
Claremont	81	22	44.4	0.99	T.
Concord	80	20	43.8	0.90	
Durham	81	22	45.9	2.09	
Grafton	78	18	40.4	0.98	
Hanover	78	16	42.4	0.92	.....
Keene	81	18	43.4	1.86	
Littleton	79	19	41.8	1.14	T.
Nashua	82	23	45.8	1.80	
Newton	79	23	45.0	1.54	
North Conway	80	17	42.8	0.90	
Peterboro	78	18	42.8	1.83	
Plymouth	80	21	41.3	0.65	T.
Sanbornton	76	21	42.2	1.27	T.
Stratford	77	12	41.4	0.85	T.
Warner	.....	.....	.....	1.55	T.
New Jersey.					
Asbury Park	74	25	49.4	1.81	
Bayonne	80	26	52.0	2.32	
Belvidere	81	22	51.5	2.12	
Bergen Point	77	28	51.8	2.56	T.
Beverly	82	24	53.2	2.14	
Billingsport *1	79	30	51.8	3.05	
Boonton	78	25	49.0	2.27	
Bridgeton	80	26	53.4	2.38	
Camden	78	27	52.7	1.96	
Cape May C. H.	75	24	51.2	1.86	
Charlotteburg	78	19	47.5	2.39	
Clayton	79	23	51.2	2.49	
College Farm	77	25	50.8	2.38	
Deckertown	79	22	49.5	1.64	
Dover	81	22	51.4	2.51	T.
Egg Harbor City	78	22	51.0	2.26	
Elizabeth	80	23	51.4	2.75	T.
Englewood	76	26	47.4	2.64	
Flemington	76	24	51.4	2.28	
Freehold *c*	77	23	52.4	2.27	
Friesburg	80	23	51.7	2.73	
Hammonton	.....	.....	.....	2.48	
Hanover	75	25	49.8	2.52	
Hightstown	78	26	52.7	2.68	T.
Imlaystown	80	25	53.2	2.03	
Lambertville	79	23	52.6	2.33	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lebanon	.....	.....	.....	2.60	
Moorestown	78	25	52.0	2.40	
Mount Pleasant	.....	.....	.....	2.51	
Newark	78	27	50.6	2.28	T.
New Brunswick	79	25	52.4	2.59	T.
Newton	79	18	49.0	2.61	
Ocean City	71	22	48.2	2.34	
Oceanic	78	28	49.8	1.84	T.
Paterson	82	27	52.8	1.89	T.
Perth Amboy	79	27	50.8	2.09	T.
Plainfield	78	22	50.2	3.03	0.2
Rancocas	.....	.....	.....	2.19	
Rivervale	78	19	47.8	1.93	
Rocktown	.....	.....	.....	2.59	
Roseland	77	19	48.4	2.18	T.
Salem	80	27	53.4	2.38	
Somerville	80	29	51.5	2.66	T.
South Orange	76	28	50.4	2.78	
Toms River	80	17	49.0	1.90	
Trenton	72	27	51.6	1.59	T.
Tuckerton	74	22	49.2	2.35	
Vineland	81	24	52.4	2.21	
Woodbine	75[1]	22	53.0	2.16	
New Mexico.					
Albert	77	27	52.6	4.08	T.
Albuquerque	78	27	52.0	0.33	T.
Alma	81	24	50.4	1.81	
Aztec	75	19	46.1	1.41	2.9
Bellranch	.....	.....	.....	2.89	
Bernalillo	81	27	53.0	0.45	T.
Bluewater	75	14	49.6	0.63	1.0
Cambray	.....	.....	.....	0.00	
Deming	.....	.....	.....	0.00	
East Lasvegas	72	21	46.6	2.25	0.5
Engle	79	26	50.8	0.00	
Espanola	66	24	43.4	1.57	
Folsom	72	18	44.6	7.19	16.6
Fort Bayard	76	26	47.6	0.41	T.
Fort Stanton	78	12	47.8	0.90	T.
Fort Union	73	11	44.8	1.55	T.
Fort Wingate	75	20	42.4	2.60	T.
Gage	.....	.....	.....	0.15	
Gallisteo	77	24	47.8	0.28	
Gallinas Spring	79	25	50.3	1.58	
Hillsboro	82	24	50.6	0.16	T.
Horse Springs	86	20	52.3	1.05	2.0
Las Vegas Hotsprings	70	19	45.0	2.03	1.0
Lordsburg	.....	.....	.....	0.49	
Los Lunas	83	28	54.4	0.90	
Lower Penasco	74	26	51.4	0.30	
Lyons Ranch	85	27	53.0	0.81	0.5
Mesilla Park	83	29	54.4	0.31	
Raton	72	17	43.4	6.00	28.0
Rincon	82	25	57.4	T.	
Roswell	83	24	55.9	0.39	
San Marcial	83	27	54.1	0.18	
Socorro	79	26	51.2	0.18	
Springer	76	20	47.2	3.25	T.
Whiteoaks	75[4]	20[4]	49.2[4]	1.66	2.0
Woodbury	79	20	48.4	0.71	T.
New York.					
Adams	.....	.....	.....	0.67	8.0
Addison	76	20	47.6	1.49	.....
Akron	.....	.....	.....	1.02	
Alfred	71	15	44.7	1.53	1.4
Angelica	73	17	44.0	1.44	1.0
Appleton	76	24	44.6	0.91	T.
Arcade	72	16	42.8	1.82	1.3
Atlanta	75	18	44.7	2.08	2.5
Auburn	79	21	48.1	1.29	1.0
Axton	73	14	38.2	0.60	T.
Baldwinsville	76	23	46.2	1.33	T.
Bedford *a*	77	24	48.2	1.64	
Bedford *b*	.....	.....	.....	1.80	
Big Sandy[10]	72	20	44.2	.....	.....
Bolivar	73	14	43.3	1.22	1.0
Bouckville	75	16	42.0	1.21	T.
Boyds Corners	.....	.....	.....	1.92	
Brentwood	78	24	49.0	1.80	
Brockport	75	24	47.2	1.78	2.0
Caldwell	72	22	44.0	0.94	T.
Canajoharie	80	22	44.5	1.36	
Canton	75	19	43.2	0.93	T.
Carmel	74	27	49.8	2.13	
Carvers Falls	77	17	43.0	1.02	T.
Catskill	77	26	48.8	1.09	
Cedarhill	82	25	48.6	1.60	
Charlotte[10]	72	28	45.3	.....	.....
Chenango Forks	.....	.....	.....	1.65	T.
Cooperstown	76	19	42.0	1.94	
Cortland	73	20	46.3	1.56	
Cutchogue	72	29	48.0	1.63	
Dekalb Junction	.....	.....	.....	0.69	T.
Easton	.....	.....	.....	1.38	
Elba	76	19	45.7	1.55	1.0
Elmira	73	22	48.2	1.58	
New York—Cont'd.					
Franklinville	73	15	43.6	1.37	1.3
Fulton	.....	.....	.....	1.56	1.5
Glens Falls	77	19	46.0	0.60	
Gloversville	79	20	44.0	1.63	T.
Greenwich	77[3]	21[4]	45.0[4]	1.20	
Griffin Corners	.....	.....	.....	1.87	1.0
Haskinville	.....	.....	.....	1.60	1.0
Hemlock	70	23	45.8	1.70	.....
Honeymead Brook	78	20	46.0	1.90	
Hoosick Falls	.....	.....	.....	1.46	
Humphrey	73	19	44.1	1.89	1.1
Indian Lake	71	15	39.4	0.97	0.2
Ithaca	77	21	45.4	1.68	2.6
Jamestown	72	22	45.6	2.13	1.5
Jay	78	21	43.8	0.35	T.
Keene Valley	77	20	41.9	0.83	0.4
King Ferry	.....	.....	.....	2.06	
King Station	.....	.....	.....	1.50	
Liberty	79	12	45.2	2.90	
Littlefalls	77	18	42.6	1.97	T.
Lockport	72	23	47.2	1.26	T.
Lowville	74	19	42.4	0.75	
Lyndonville	.....	.....	.....	1.09	
Lyons	76	24	48.0	1.19	2.0
Mayle	.....	.....	.....	1.01	1.0
Middletown	73	24	47.9	1.79	
Mohonk Lake	71	22	47.1	3.26	
Moira	80	9	45.4	1.17	T.
Mount Morris	74	20	46.2	.....	.....
Newark Valley	.....	.....	.....	1.44	
New Lisbon	76	18	41.0	1.30	T.
North Germantown	78	26	48.4	1.26	
North Hammond	76	20	44.9	1.14	
Number Four	70	14	39.0	0.81	2.6
Nunda	78	18	47.3	2.21	1.0
Ogdensburg	77	20	46.8	0.87	T.
Old Chatham	.....	.....	.....	1.67	
Oneonta	78	21	46.2	1.35	
Oxford	76	16	42.8	1.70	0.5
Palermo	75	22	44.2	0.53	1.0
Penn Yan	78	22	48.2	1.25	1.6
Perry City	77	16	43.8	2.00	2.4
Phœnix	.....	.....	.....	1.98	.....
Pine City	.....	.....	.....	1.27	
Plattsburg Barracks	75	10	44.4	0.83	0.2
Port Byron	75	23	44.7	0.70	1.0
Port Jervis	79	22	49.0	2.06	
Poughkeepsie	79	19	46.7	0.28	
Primrose	77	22	47.2	1.95	T.
Red Hook	.....	.....	.....	1.40	
Richmondville	76	19	43.2	2.35	T.
Ridgeway	75	23	46.0	1.08	
Rome	72	20	41.7	1.73	
Romulus	78	22	47.6	0.59	2.0
Rose	.....	.....	.....	1.47	3.0
St. Johnsville	81	22	45.3	1.71	0.4
Salisbury Mills	.....	.....	.....	2.60	
Saranac Lake	74	16	38.6	0.73	T.
Saratoga Springs	77	23	45.5	1.34	T.
Schenectady	83	24	48.9	1.97	
Schenevus	.....	.....	.....	2.04	T.
Scottsville	.....	.....	.....	1.62	
Setauket	74	30	48.6	1.53	
Shortsville	75	22	46.8	1.07	1.9
Skaneateles	.....	.....	.....	1.56	
South Canisteo	75	15	44.0	1.60	3.0
Southeast Reservoir	.....	.....	.....	2.27	
South Kortright	75	16	42.2	1.71	
Straits Corners	81	15	45.2	1.76	1.2
Ticonderoga	74	23	44.6	0.27	
Volusia	70	19	44.8	1.65	
Wappingers Falls	80	24	48.3	1.71	T.
Warwick	.....	.....	.....	1.76	
Watertown	76	18	44.2	0.64	3.5
Waverly	78	19	46.8	1.58	0.2
Wedgwood	76	19	44.8	1.80	3.0
West Berne	71	18	43.6	2.23	T.
West Chazy	75	20	43.6	.....	.....
Westfield *b*	74	21	45.8	1.13	
Westfield *c*	74	22	44.0	1.86	
Williamson	.....	.....	.....	1.43	2.0
Windham	68	18	41.7	1.75	T.
North Carolina.					
Abshers	85	26	56.3	4.89	
Asheville	.....	.....	.....	4.18	
Biltmore	84	25	56.2	3.31	T.
Bryson City	.....	.....	.....	4.67	0.2
Chapelhill	86	28	58.0	6.09	
Cherryville	85	25	60.2	7.55	
Currituck	.....	.....	.....	3.08	T.
Edenton	83	34	58.8	3.40	
Experimental Farm	86	29	61.0	4.67	
Fairbluff	.....	.....	.....	4.22	
Fayetteville	88	30	61.2	3.51	
Goldsboro	83	30	57.6	4.44	
Greensboro	82	28	57.4	3.44	
North Carolina—Cont'd.					
Greenville	85	30	59.4	5.02	
Henderson	84	28	56.8	3.38	
Hendersonville	82	26	54.4	8.06	T.
Henrietta	86	26	60.0	6.77	
Highlands	72	15	51.0	10.20	T.
Horse Cove	77	28	56.0	8.86	T.
Kinston	86	31	59.0	6.61	
Linville	71	22	48.0	5.51	
Littleton	87	28	57.8	3.49	
Louisburg	85	28	58.9	3.48	T.
Lumberton	84	34	61.2	5.14	
Marion	87	25	57.8	9.70	T.
Marshall	86	23	54.6	2.62	0.5
Mocksville	85	30	58.1	4.68	
Moncure	83	29	59.0	4.43	
Monroe	84	23	58.3	5.63	
Mountairy	80	28	55.8	.....	
Mount Pleasant	84	26	58.8	4.34	
Murphy	.....	.....	.....	4.83	T.
Newbern	85	28	59.9	4.58	
Oakridge	84	27	56.9	3.66	
Patterson[11]	80	24	52.7	4.56	
Pittsboro	85	26	57.8	5.75	
Rockingham	87	28	60.5	5.11	
Roxboro	84	29	58.6	6.24	
Salem	88	28	58.2	3.02	
Salisbury	84	29	60.2	4.98	
Saxon	86	23	57.4	3.35	
Selma	88	30	60.2	3.65	
Settle	82	21	55.4	4.30	
Sloan	85	30	61.1	4.52	
Soapstone Mount	85	22	57.0	5.76	
Southern Pines *a*	.....	.....	.....	4.77	
Southern Pines *b*	83	33	63.2	3.90	
Springhope[11]	84	32	56.5	3.15	
Tarboro	87	28	59.5	3.34	
Washington	88	34	60.5	5.76	
Waynesville	81	20	52.6	6.41	
Weldon *a*	80	32	56.4	3.23	
Weldon *b*	.....	.....	.....	3.23	
North Dakota.					
Amenia	86	16	49.4	1.92	
Ashley	84	22	48.6	1.91	
Berlin	85	17	48.0	1.03	T.
Bottineau	82	18	47.8	0.20	
Buxton	83	19	48.0	1.49	
Churchs Ferry	92	16	49.0	0.32	
Coalharbor	86	20	49.6	0.42	
Devils Lake	88	20	48.8	1.10	
Dickinson	87	19	50.0	0.65	
Donnybrook	.....	.....	.....	0.32	
Dunseith	81	18	49.0	0.23	T.
Ellendale	83	23	50.6	2.04	
Falconer	88	20	50.6	1.40	
Fargo	87	15	50.0	1.82	
Forman	83	20	49.6	2.28	
Fort Berthold	90	19	51.4	0.96	
Fort Yates	91	15	48.8	0.10	
Fullerton	84	20	49.2	1.74	T.
Gallatin	84	12	47.6	1.65	T.
Glenullin	.....	.....	.....	0.43	
Grafton	91	19	49.5	0.75	
Hamilton	91	17	48.4	0.18	
Hannaford	85	20	50.0	1.30	
Jamestown	90	25	53.0	0.41	
Langdon	88	10	47.1	0.18	
Larimore	89	17	48.2	1.24	
Lisbon	85	20	49.4	3.32	
McKinney	81	17	48.8	0.05	
Mayville[8]	86	23	53.0	1.37	
Medora	90	19	50.7	0.75	
Melville	88	15	50.0	0.38	
Milton	88	15	45.5	0.60	
Minnewaukon	89	13	49.0	T.	
Minot	85	21	49.8	0.60	
Minto	93[4]	15	49.6	1.29	
Napoleon	86	18	48.3	0.80	
New England	83	16	44.9	0.80	
Oakdale	81	21	49.6	0.24	
Pembina	89	16	49.0	1.79	1.0
Portal[8]	79	18	48.8	T.	
Power	82	15	48.0	1.32	
St. John	80	11	45.2	0.49	
Sheyenne	86	22	52.4	0.06	
Steele	86	22	50.0	0.71	
Towner	86	17	48.4	0.20	
University	85	20	50.4	1.22	
Wahpeton	86	20	51.5	1.15	
Willow City	88	18	50.1	T.	
Woodbridge	84	13	46.8	0.16	
Ohio.					
Akron	80	21	48.4	2.01	0.7
Annapolis	81	19	48.4	1.72	T.
Ashland	80	19	48.4	2.29	3.0
Ashtabula	73	18	43.8	1.80	2.0
Atwater	.....	.....	.....	1.57	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bangorville	80	19	49.7	2.16	1.3
Bellefontaine	79	24	50.1	2.78	
Bement				1.85	1.0
Benton Ridge	80	22	48.8	2.72	1.5
Bethany	83	23	52.6	1.33	
Bigprairie	81	20	49.4		
Binola				1.64	2.0
Bladensburg	80	15	48.0	2.00	T.
Bloomingburg	80	22	52.4	1.40	
Bowling Green	80	22	48.4	2.45	1.0
Cambridge	78	18	49.6	1.98	
Camp Dennison	81	25	53.3	1.37	
Canal Dover	81	19	48.4	2.72	2.0
Canton	79	22	48.8	1.84	0.3
Cardington	82	19	49.1	2.27	1.3
Cedarville				2.17	1.0
Celina	80	21	49.4	2.05	T.
Chilicothe	84	22	52.6	1.25	T.
Circleville	80	21	52.6	1.44	T.
Clarksville	80	23	52.8	1.77	0.4
Cleveland *a*	73	25	47.6	1.76	3.1
Cleveland *b*	73	26	47.4	1.40	2.7
Clifton	83[c]	17	50.6[c]	1.90	T.
Coalton	83	18	52.2	1.02	T.
Colebrook	78	19	47.4	1.70	2.0
Dayton *a*				0.78	
Dayton *b*	84	18	52.4	1.23	
Defiance	80	18	48.6	3.17	T.
Delaware	80	18	49.8	2.58	T.
Demos	77	21	49.5	1.95	
Elyria	80	20	48.2	1.57	
Findlay	84	23	50.0	1.99	
Frankfort	80	20	52.1	1.59	
Garrettsville	78	16	47.2	2.30	1.7
Granville	79	23	49.8	3.08	T.
Gratiot	76	20	49.7	2.21	0.5
Greenfield	79[4]	27[4]	53.8[4]	1.40	T.
Greenhill	77	16	46.4	1.76	1.8
Greenville	77	22	50.0	1.90	0.5
Hanging Rock	85	23	52.4	0.32	
Hedges	81	20	49.8	2.35	T.
Hillhouse	77	15	45.3	2.29	2.0
Hillsboro	80	19	51.6	1.27	
Hiram	78	20	48.0	2.70	1.5
Hudson	80	17	47.6	2.41	3.0
Jacksonboro	81	24	52.8	1.75	
Kenton	84	21	53.0	2.30	1.7
Killbuck	78	20	49.8	2.13	0.5
Lancaster	78	20	51.8	1.61	
Logan	84[c]	25	52.2[c]		
Lowell	83	18	52.0	1.29	T.
McArthur	78	18	51.3	1.47	T.
McConnelsville	81	18	51.3	0.97	T.
Mansfield				4.85	3.5
Marietta	80	26	54.6	1.55	
Marion	81	19	50.8	3.12	0.4
Medina	83	17	48.4	1.85	T.
Milfordton	78	18	48.2	2.10	1.0
Milligan	81	17	50.0	1.15	T.
Millport	75	17	46.4	1.52	T.
Montpelier	80	22	48.2	2.23	3.5
Napoleon	81	22	50.0	2.50	T.
Neapolis				3.54	T.
New Alexandria	79	21	50.1	2.40	2.0
New Berlin	80	18	48.8	1.70	
New Bremen	82	24	52.1	1.74	
New Holland	82	21	52.3	1.29	1.5
New Paris	77	21	52.0	1.65	T.
New Richmond	83	25	54.2	1.36	
New Waterford	84	21	49.6	1.42	0.1
North Lewisburg	80	19	50.1	2.45	0.2
North Royalton	79	19	48.4	1.31	T.
Norwalk	80	19	47.8	2.57	4.0
Oberlin	82	18	48.4	1.44	
Ohio State University	79	19	50.8	2.30	0.1
Orangeville	78	18	45.9	0.45	T.
Ottawa	81	19	50.1	2.21	T.
Pataskala	84	17	50.2	2.41	1.0
Perry				1.75	3.0
Philo	79	18	49.8	1.42	T.
Plattsburg	81	20	51.0	1.60	T.
Pomeroy	84	22	54.8	0.55	T.
Portsmouth *a*				1.71	
Portsmouth *b*	87	25	57.0	1.77	
Pulse				1.70	1.2
Richwood	84	17	51.2	1.23	
Ridgeville Corners	81	19	50.1	2.39	
Ripley	82	24	54.0	1.13	T.
Rittman	74	19	47.8	1.81	T.
Rockyridge	81	30	48.5	2.21	T.
Rosewood	78	22	50.2	2.04	T.
Shenandoah	79	16	47.4	2.54	2.3
Sidney	84	25	50.6	1.80	0.7
Sinking Spring	75	24	52.4	1.05	T.
Somerset				1.57	
Springboro				2.18	
Ohio—Cont'd.					
Strongsville				2.22	
Thurman	84	21	53.6	0.98	
Tiffin	74	23	49.2	2.55	2.5
Upper Sandusky	79	20	50.2	2.20	1.0
Urbana	74	22	49.9	2.02	0.5
Vanceburg	82	23	53.8	1.00	
Vermillion	79	19	47.4	1.81	4.0
Vickery	81	21	48.8	1.72	1.2
Walnut				1.40	0.8
Warren	78	25	49.2	1.44	
Wauseon	83	21	49.6	4.04	1.9
Waverly	85	23	53.6	1.29	T.
Waynesville	82	21	52.2	1.66	
Wellington	80	19	49.0	1.31	1.0
Westerville	76	23	51.2	2.80	T.
Willoughby				1.72	
Wooster	78	30	47.8	1.70	T.
Youngstown				1.47	T.
Zanesville				1.57	
Oklahoma.					
Arapaho	91	32	60.1	5.73	T.
Beaver	87	25	55.6	4.58	1.0
Burnett	86	29	61.2	4.05	
Edmond	84	28	60.6	3.32	
Fort Reno	85	32	60.1	4.75	
Fort Sill	85	32	62.4	5.35	
Guthrie	85	32	61.4	3.20	
Hennessey	90	32	60.6	3.81	T.
Jefferson	92	27	59.9	3.03	T.
Jenkins	91	30	59.6	6.58	T.
Kingfisher	86	31	60.8	3.54	
Mangum	89	30	60.2	5.00	
Newkirk	85	26	58.4	4.04	
Norman	84	31	60.0	5.08	
Osage	91	27	61.8	6.58	
Perry	88	30	60.8	5.32	
Sac and Fox Agency	87	29	59.8	2.58	
Stillwater	85	32	60.8	4.43	
Waukomis	91	30	60.4	4.12	T.
Wood				5.04	
Oregon.					
Albany *a* [1]	88	36	53.0	1.23	
Albany *b*				1.77	
Alpha	84	31	50.2	3.77	
Arlington	87	19	56.6	0.65	
Ashland *b*	81	25	49.4	1.45	0.8
Aurora	89	38	53.0	1.67	
Aurora (near)	84	30	50.6	2.17	
Bandon	79	34	50.0	4.64	
Bay City	75	30	50.2	5.40	
Beulah	80	18	44.7	1.15	
Blalock	84	33	55.4	0.62	
Brownsville [1]	84	40	54.0	1.62	
Bullrun	75	32	49.2	3.96	
Burns	75	19	43.7	1.15	8.0
Burns (near)	77	21	43.8	1.11	5.0
Cascade Locks	84	35	53.6	2.15	
Comstock [1]	82	37	52.0	3.39	
Coquille				3.94	
Corvallis	83	29	51.4	1.72	
Dayville	80	24	48.9	1.65	T.
Ella				1.08	
Eugene	85	31	51.1	2.35	
Fairview				6.14	
Falls City	83	30	49.7	2.07	T.
Forestgrove	82	26	50.4	2.10	
Gardiner	85	35	52.1	4.50	
Glenora	80	30	48.7	7.80	T.
Government Camp	69	13	39.8	5.04	29.0
Grants Pass	84	25	51.0	1.89	
Happy Valley	75	13	42.2	1.44	6.3
Hare	78	31[c]	48.2[c]	7.60	T.
Jacksonville	81	25	50.2	1.39	
Joseph	73	15	42.0	2.00	19.5
Junction City [1]	82	38	50.6	1.84	
Kerby	85	25	51.1	2.79	
Klamath Falls	79	20	45.7		
Lafayette [1]	82	36	52.4	1.21	
Lagrande	75	27	49.2	2.52	5.0
Lakeview	72	19	42.8	1.38	0.7
Lonerock	76	16	42.8	0.77	T.
McMinnville	86	29	51.2	1.43	
Merlin [1]	84	28	54.8	1.31	
Monmouth *a* [1]	80	34	51.6	1.25	
Monmouth *b*	84	30	50.3	1.53	
Monroe	82	31	51.0	1.92	0.5
Mount Angel	84	35	52.2	2.16	
Nehalem				5.74	
Newberg	88	28	50.8	2.24	
Newbridge	79	13	46.5	1.19	3.0
Newport	84	31	50.3	3.67	
Pendleton	84	28	52.8	1.72	T.
Placer				2.72	
Prineville	77	24	50.0	0.61	T.
Riddles [1]	82	34	52.6	1.44	
Oregon—Cont'd.					
Riverside	80	19	48.0	1.23	T.
Salem	84	29	50.6	2.60	
Sheridan [1]	77	30	48.1	1.82	
Silverton [1]	86	36	54.1	2.05	
Siskiyou [1]	66	28	44.0	0.10	
Sparta	70	16	43.7	2.60	8.5
Springfield [1]	80	34	51.4	2.75	
Stafford	84	32	51.4	2.45	
The Dalles	86	29	53.9	0.42	
Tillamook				2.42	
Toledo	86	27	49.3	3.50	
Umatilla				1.02	
Vale	77	25	50.0	1.31	T.
Westfork [1]	84	32	55.7	2.35	
Weston	79	26	48.4	3.61	2.2
Williams	81	24	50.0	1.54	
Pennsylvania.					
Altoona	80	22	49.6	1.22	
Aqueduct	83	24	54.4	1.38	1.2
Athens	78	19	47.0	1.73	
Beaver Dam				1.79	T.
Brookville				1.47	2.5
Browers Lock				1.92	
Butler	79	20	47.3	1.47	1.0
Carlisle	78	24	51.5	1.57	1.0
Cassandra	75	21	46.6	2.77	0.8
Cedarrun				1.10	
Centerhall	77	21	49.6	1.52	3.0
Chambersburg	80	23	50.4	1.92	5.0
Coatesville	80	23	52.0	2.19	T.
Confluence	78	20	46.0	1.66	2.0
Coopersburg	76	25	51.6	1.94	
Davis Island Dam				1.21	
Derry Station	90	22	47.3	1.81	2.0
Driftwood				1.22	1.0
Duncannon				1.51	
Dushore	79	15	45.2	1.05	0.3
Dyberry	76	21	44.1	1.70	T.
East Bloomsburg				1.50	
East Mauch Chunk	82	19	50.2	1.48	
Easton	77	26	50.8	1.63	T.
Ellwood Junction				1.00	
Emporium	77	18	47.1	1.29	1.7
Ephrata	81	22	51.6	1.64	0.3
Everett	74	26	47.6	1.25	T.
Forks of Neshaminy [1]	78	32	52.2	2.42	
Franklin	80	18	47.2	0.60	T.
Freeport				1.33	
Girardville				0.94	0.2
Grampian	76	24	47.5	1.36	4.0
Greensboro	84			1.56	1.0
Hamburg				2.05	
Hamlinton	75	20	46.2	1.68	
Hawthorn	84	21	48.4	1.18	3.0
Hews Island Dam				1.46	
Huntingdon *a*	83	21	50.2	1.75	2.0
Huntingdon *b*				2.64	1.7
Irwin				1.45	0.5
Johnstown	82	24	50.2	1.41	0.5
Keating				1.28	1.0
Kennett Square	77	23	51.8	2.53	
Lancaster	75	22	50.9[c]	1.29	
Lawrenceville	75	17	44.2	1.11	0.2
Lebanon	80	23	51.2	2.08	0.7
Leroy	77	18	46.5	1.34	0.6
Lewisburg	81	22	50.6	1.07	
Lockhaven *a*	82	23	52.4	1.41	2.0
Lockhaven *b*				1.20	
Lock No. 4				1.74	
Lycippus	78	20	48.8	1.51	1.9
Mifflin				0.50	
Nisbet				0.84	
Oil City				1.40	2.6
Parker				1.51	2.0
Philadelphia	77	29	54.2	2.17	T.
Quakertown	78	23	50.1	2.07	T.
Reading [2]			51.5	1.56	
Renovo *a*				0.82	1.0
Renovo *b*	80	20	49.8	0.80	1.0
Saegerstown	80	13	45.7	1.58	1.5
St. Marys	74	18	45.8	0.86	1.5
Scranton	80	22	48.7	1.81	
Selinsgrove	75	22	49.8	1.16	1.0
Shawmont				1.70	
Sinnamahoning				0.42	
Smethport	75	18	45.0	1.25	
Somerset	78	18	45.4	2.80	4.5
South Eaton	77	19	47.2	0.97	
State College	78	22	49.3	1.93	2.8
Sunbury				0.75	
Swarthmore	77	28	52.8	2.00	
Towanda	78	21	47.0	1.31	T.
Troutrun				2.50	
Uniontown	78	24	49.8	1.85	1.0
Warren	78	19	48.9	2.09	2.0
Wellsboro	75	18	47.8	1.22	1.5

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
Westchester	76	25	51.7	2.39	
West Newton	.....	.....	.....	1.65	1.0
Wilkesbarre	80	25	49.1	1.01	T.
Williamsport	79	25	49.3	0.81	T.
York	81	22	51.0	1.35	0.2
Rhode Island.					
Bristol	63	29	47.0	2.01	
Kingston	73	19	46.5	3.67	
Pawtucket	70	29	44.0	1.73	
Providence[a]	78	28	51.2	1.90	
Providence[c]	77	24	47.5	2.08	
South Carolina.					
Allendale	86	30	64.4	3.78	
Beaufort	86	38	67.6	4.54	
Blackville	88	29	64.7	5.87	
Calhoun Falls	.....	.....	... .	7.11	
Camden	.....	.....	.....	7.17	
Cheraw *a*	85	29	59.9	5.01	
Cheraw *b*	.....	.....	.....	5.12	
Clemson College	85	24	60.4	7.39	
Conway	.....	.....	.....	3.00	
Darlington	.....	... ..	.....	6.20	
Edisto	... .	.....	.....	5.20	
Effingham	.....	.....	.....	4.67	
Florence	85	31	61.8	4.64	
Gaffney	.....	.....	.....	8.55	
Georgetown	83	39	62 6	2.35	
Gillisonville	90	31	66.6	4.96	
Greenville	81	24	57.6	7.92	
Greenwood	87	28	61.2	7.28	
Holland	85	24	60.0	7.19	
Kingstree *a*	85	32	62.0	3.60	
Kingstree *b*	.....	.....	.....	3.66	
Liberty	87	25	60.4	6.01	
Little Mountain	87	30	62.4	6.04	
Longshore	87	26	61.6	8.50	
Pinopolis [*1]	87	34	63.5	3.95	
St. George	88	31	63.2	3.69	
St. Matthews	87	33	63.8	4.62	
St. Stephens	.....	.....	.....	3.71	
Santuck	86	25	60.6	6.00	
Shaws Fork	.....	.....	.....	10.32	
Smiths Mills	.....	.....	.....	3.19	
Spartanburg	87	29	57.8	5.94	
Statesburg	86	32	64.4	6.59	
Summerville	85	35	64.8	6.14	
Temperance	80	29	61.2	5.51	
Trenton	84	35	64.8	5.04	
Trial	83	26	60.6	3.23	
Walhalla	85	27	59.6	6.88	
Winnsboro	79	28	59.4	6.95	
Winthrop College	85	29	61.0	5.13	
Yemassee	87	35	64.6	3.26	
Yorkville	89	30	62.0	7.46	
South Dakota.					
Aberdeen	87	20	50.7	4.15	
Academy	88	24	52.6	2.73	
Alexandria	84	21	52.8	4.07	T.
Armour	81	22	51.4	4.81	T.
Ashcroft	92	16	49.6	1.28	.....
Bowdle	86	19	48.4	2.24	
Brookings	80	21	50.2	1.68	
Canton	82	21	51.6	3.45	0.5
Centerville	.....	.....	.....	2.78	0.5
Chamberlain	84	25	54.6	3.13	
Clark	81	22	50.4	1.02	
Desmet	88	24	51.6	1.65	T.
Doland	87	17	52.0	1.98	
Elk Point	80	25	54.8	3.12	0.2
Farmingdale	.....	.....	.....	3.12	2.0
Faulkton	84	22	49.4	4.08	
Flandreau	82	33	50.8	3.11	T.
Forestburg	83	20	49.7	2.52	T.
Forest City	89	24	53.9	2.75	
Fort Meade	86	27	50.4	0.95	3.5
Gannvalley	.....	.....	.....	2.60	
Gary	80	24	53.9	2.02	
Grand River School	91	20	51.8	1.63	
Greenwood	82	24	54.4	4.30	
Hartman	82	26	51.0	3.26	
Highmore	85[f]	22[f]	54.2[f]	3.20	
Hitchcock	.....	.....	.....	3.66	
Hotch City	84	18	52.9	2.43	
Hot Springs	83	28	50.1	4.38	4.0
Howard	83	30	51.4	1.61	T.
Interior	88	28	56.2	2.50	
Ipswich	86	17	49.3	2.10	
Kimball	81	24	52.2	2.91	
Leola	82	23	48.2	2.55	
Leslie	92	15	52.2	0.87	
Mellette	83	18	49.9	4.15	T.
Menno	81	19	52.5	2.88	
Millbank	81	24	49.4	0.83	
Mitchell	83	21	53.7	4.24	T.
Oelrichs	78	22	48.8	2.30	
Parker	80	25	51.3	2.92	T.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Plankinton	80	23	51.6	3.51	
Redfield	82	17	50.5	3.78	
Rosebud	82	27	51.2	2.69	
St. Lawrence	87	.....	.....	4.03	T.
Shiloh	87	20	53.6	1.31	T.
Sioux Falls	81	20	48.4	2.28	
Sisseton Agency	80	21	49.9	1.18	T.
Spearfish	82	26	50.0	2.49	
Tyndall	80	20	51.1	4.38	
Watertown	80	19	49.2	1.30	
Waubay	80	20	48.2	1.47	
Wentworth	.....	21	.....	3.01	
Wolsey	.....	.....	.....	2.45	T.
Tennessee.					
Andersonville	89	22	56.4	3.21	
Arlington	83	30	58.6	4.83	
Ashwood	84	26	59.2	6.02	
Benton	83[b]	24[c]	58.9[c]	5.37	
Bluff City	.....	.....	.....	2.19	T.
Bolivar	84	29	60.2	5.57	
Bristol	82	27	54.8	1.35	T.
Brownsville	85	32	60.2	2.92	
Byrdstown	84	25	58.4	3.13	
Carthage	86	.....	.....	3.51	
Charleston	.....	.....	.....	6.31	
Clarksville	82	29	58.8	3.49	
Clinton	.....	.....	.....	3.72	
Covington	87	36	61.2	4.33	
Decatur	86	24	59.6	5.13	
Dyersburg [c]	84	39	62.0	3.69	
Elizabethton	83	23	55.4	1.14	T.
Elk Valley	.....	.....	.....	2.75	
Erasmus	84	14	54.2	5.94	
Florence	80	28	58.4	4.45	
Franklin	83	28	59.6	5.30	
Grace [*1]	82	28	60.8	5.80	
Greeneville	84	22	56.1	2.13	
Harriman	84	25	58.5	3.73	
Hohenwald	83	23	58.8	7.88	
Iron City	85	24	60.0	10.43	
Jackson	83	33	62.1	3.45	
Johnsonville	87	25	59.3	5.67	
Jonesboro [*1]	78	32	54.6	3.34	
Kingston	.....	.....	.....	4.44	
Lafayette [*b]	85	32	59.0	4.60	
Lewisburg	84	26	59.2	4.66	
Lynnville	84	28	60.1	5.94	
McKenzie	86	32	60.6	3.16	
McMinnville	80	27	59.0	4.85	
Madison	90	23	60.0	4.80	
Maryville [*b]	84	26	59.8	2.86	
Milan	86	30	60.2	3.47	
Newport	83	27	57.9	1.97	
Nunnelly	84	25	58.6	6.18	
Oakhill	86	24	58.6	6.01	
Palmetto	84	27	59.5	4.58	
Peryear [*b]	86	27	62.3	4.30	
Pope	87	21	58.3	6.25	
Rogersville	81	24	56.6	2.38	
Rugby	82	19	55.0	2.77	
Savannah	90	28	62.0	9.83	
Sewanee	80	28	58.2	9.47	
Silverlake	78	21	51.8	1.98	0.5
Springdale	82[e]	22[e]	55.4[e]	1.79	
Springfield	85	25	58.6	2.60	
Tazewell	.....	.....	.....	1.75	
Tellico Plains	85	24	59.9	3.92	
Tracy City	84	21	57.0	6.94	
Trenton	81	37	61.6	2.99	
Tullahoma	84	23	59.1	7.50	
Union City	83	31	59.0	1.90	
Wildersville	82	29	60.4	3.67	
Yukon	82	28	60.9	10.62	
Texas.					
Alice	94	40	71.6	1.55	
Alpine	89	27	58.4	0.15	
Alvin	.....	.....	.....	7.71	
Anna	86	30	64.1	9.06	
Anson	.....	.....	.....	3.85	
Arthur	.....	.....	.....	2.87	
Austin *a*	85	35	66.0	9.63	
Austin *b* [*b]	83	36	64.0	.....	
Ballinger	86	32	62.2	7.53	
Beeville	88	37	67.2	8.57	
Big Springs	.....	.....	.....	5.12	
Blanco	84	38	62.2	8.90	
Boerne [*1]	86	35	63.7	12.36	
Bowie	87	33	63.3	7.06	
Brazoria	84	42	68.2	4.93	
Brenham	84	38	66.8	6.74	
Brighton	84	43	70.2	2.73	
Brownwood	89	32	63.2	9.20	
Burnet [*1]	78	33	63.2	8.40	
Camp Eagle Pass	87	38	67.2	8.10	
Coleman	82	35	62.3	7.87	
College Station	82	39	66.7	9.13	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd	°	°	°	*Ins.*	*Ins.*
Colorado	88	.....	.....	12.31	
Columbia	83	40	67.4	5.45	
Corsicana	88	37	66.4	6.73	
Cuero	86	40	68.8	6.10	
Dallas	85	33	62.8	5.66	
Danevang	88	38	69.4	6.52	
Dublin	82	33	62.6	5.98	
Duval	82	39	64.5	9.34	
Emory	85	31	64.5	3.19	
Estelle	86	32	65.0	5.71	
Forestburg	.....	.....	.....	5.96	
Fort Brown	92	47	72.4	.....	
Fort Clark	86	38	67.4	7.45	
Fort McIntosh	97	41	72.4	4.76	
Fort Ringgold	99	30	73.8	2.03	
Fort Stockton	.....	.....	.....	1.18	
Fredericksburg [*1]	81[j]	34	64.1[e]	7.42	
Gainesville	83	29	63.2	9.60	
Georgetown [*1]	86[c]	36	64.4[c]	9.06	
Grapevine	86	35	64.6	7.38	
Greenville	85	31	64.2	6.14	
Hale Center	81	32	57.8	5.01	
Hallettsville	86	39	69.0	3.77	
Haskell	.....	.....	.....	7.75	
Hearne	87	40	67.8	.....	
Henrietta	87	30	59.9	4.98	
Hewitt	.....	.....	.....	13.50	
Hondo	.....	.....	.....	7.88	
Houston	84	41	67.2	6.57	
Hulen	.....	.....	.....	8.29	
Huntsville	85	38	66.2	6.30	
Jacksonville	84	33	66.0	7.17	
Jasper	98	37	68.8	6.12	
Junction	.....	.....	.....	9.30	
Kaufman	96	34	67.2	.....	
Kent	.....	.....	.....	0.16	
Kerrville	83	.....	.....	9 85	
Lampasas	86	30	66.2	9.01	
Langtry	81	42	61.4	10.13	
Llano [*b]	82	37	65.8	7.98	
Longview	90	34	65.4	6.60	
Luling	86	37	67.2	10.86	
Mann	87	34	66.2	9.31	
Mount Blanco	79	29	57.4	4.09	
New Braunfels	83	29	66.8	11.80	
Panter	.....	.....	.....	7.97	
Paris *a*	88	29	61.6	0.73	
Point Isabel [*1]	86	60	73.0	1.75	
Rhineland	82	32	62.1	5.90	
Rockisland	83	35[l]	66.2[c]	7.37	
Rockport [*1]	81	50	66.8	.....	
Runge	.....	39	.....	7.68	
Sabine	85	46	69.0	5.49	
Saginaw [*1]	82	32	64.7	9.69	
Sanderson	82	35	66.6	0.75	
San Marcos	85	38	66.4	12.37	
Santa Gertrudes Ranch	.....	.....	.....	1.18	
Sugarland	84	35	67.4	6.33	
Sulphur Springs	86	34	65.4	2.19	
Temple *a*	83	36	65.2	11.46	
Temple *b*	84	36	62.0	11.40	
Tulia	84	27	53.9	6.60	
Turnersville	80	34	64.2	8.85	
Tyler	90	35	65.2	4.50	
Valentine	82	.....	.....	0.00	
Victoria	.....	.....	.....	5.08	
Waco	85	37	65.4	9.50	
Waxahachie	86	29	65.3	5.70	
Weatherford	83	32	63.8	6.85	
Wichita Falls	.....	.....	.....	6.60	
Utah.					
Alpine	.....	.....	.....	2.51	
Bluecreek [*1]	77	28	46.4	3.10	T.
Castledale	75	24	46.8	1.38	
Corinne	.....	.....	.....	3.54	
Deseret	82	23	46.6	2.85	7.2
Elgin	84	26	53.2	0.86	
Farmington	.....	.....	.....	4.56	2.9
Fillmore	83	23	46.2	3.18	
Fish Springs	78	26	45.8	4.65	8.0
Fort Duchesne	79	26	48.4	1.72	
Giles	82	19	51.0	0.54	
Grover	67	10	41.6	1.84	14.5
Heber	75	24	44.5	2.53	
Henefer	77	22	44.2	1.20	T.
Hite	86	37	57.4	.....	
Huntsville	.....	.....	.....	2.67	
Kelton [*1]	80	32	49.4	2.70	T.
Levan	77	22	45.8	3.70	20.0
Loa	72	13	40.7	1.80	18.0
Logan	75	26	47.0	4.07	
Marysvale [*1]	52	20	32.3	1.60	16.0
Millville	.....	.....	.....	4.03	
Minersville	79	26	45.9	2.32	4.5
Moab	84	30	53.3	1.03	T
Mount Pleasant	76	33	43.9	2.56	9.6

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Utah—Cont'd.	°	°	°	*Ins.*	*Ins.*
Park City	67	20	41.4	3.56	15.0
Parowan	77	20	43.8	2.64	22.8
Pinto	72	19	41.8	2.31	3.0
Promontory [1]	72	26	45.6	.....	.....
Provo	81	25	48.0	1.65	
St. George	88	25	51.2	2.07	
Scipio	79	19	45.4	2.09	2 0
Snowville	76	27	45.9	3.52	
Soldier Summit	64	20	45.2	0.49	4.9
Thistle	80	23	49.1	1.77	3.7
Tooele	78	25	47.4	3.95	
Tropic	74	13	39.0	4 83	8.0
Vernal	75	28	47.0	2.00	
Wellington	76	23	44.8	1.76	
Vermont.					
Bennington	79	20	46.5	1.29	
Brattleboro	75	23	45.6	1.53	
Burlington	69	23	44.9	0.91	T.
Chelsea	72	15	39.0	1.13	T.
Cornwall	75	23	43.4	0.32	
Derby	75	12	40.4	1.86	
Enosburg Falls	81	25	45.6	2.19	3.0
Hartland	79	17	40.8	0.93	
Jacksonville	69	19	41.2	3.14	
Manchester	63	19	41.2	1.46	T.
Norwich	78	15	41.3	0.92	T.
St. Johnsbury	75	13	40.3	1.49	T.
Vernon	.....	.....	.....	1.92	
Wells	72	18	42.7	0.96	0.5
Woodstock	75	12	40.6	0.51	
Virginia.					
Alexandria	85	30	55.7	1.76	T.
Ashland	82	28	56.4	3.42	
Barboursville	84	25	55.2	2.50	T.
Bedford	78	29	54.0	3.93	
Bigstone Gap	84	21	55.2	1.78	T.
Birdsnest [1]	71	35	52 1	2.90	
Blacksburg	80	23	51.2	2.20	T.
Bon Air	83	28	56.0	4 37	
Buckingham	88	27	55.8	2.92	
Burkes Garden	74	20	48.9	2.22	T.
Callaville	82	28	56.0	2.99	
Charlottesville	82	28	57.5	3.15	
Christiansburg	.....	.....	.....	2.24	
Clarksville	.....	.....	.....	2.48	
Cliftonforge	73	26	50 5	2.10	T.
Columbia	85	22	57.3	2.10	
Dale Enterprise	85	19	51.5	1.70	T.
Danville	.....	.....	.....	1.94	
Doswell	83	30	56.0	2.89	
Farmville	87	28	57.6	3.30	
Fontella	90	31	58.6	4.83	
Fredericksburg	84	30	55.0	3.83	T.
Freeling	.....	.....	.....	1.20	
Hampton	77	35	56.0	3.69	
Hot Springs	77	12	50.3	1.79	T.
Lexington	84	27	55.2	2.73	
Manassas	82	31	53.6	1.29	
Marion	83	23	52.7	1.93	T.
Meadowdale	78	18	48.5	0.97	1.8
Miller School	79	32	56.8	4.60	
Newport News	80	32	57.5	.....	
Petersburg	85	30	57.1	2.50	
Quantico	78	26	50.4	.....	
Radford	.....	.....	.....	0 95	
Rockymount	80	28	56 2	4.70	
Salem	85	30	57.4	2.89	
Scottsburg	84	27	57.6	6.07	
Speers Ferry	.....	.....	.....	1.79	T.
Spottsville	84	27	56.2	3.07	
Stanardsville	85	29	54.4	2.77	
Staunton	87	19	54.3	2.27	*T.
Stephens City	87	25	55.9	1.49	T.
Sunbeam	82	32	57.3	5.14	
Tobaccoville	.....	24	.....	3.57	
Warrenton	81	31	55.0	1.67	
Warsaw	81	25	53.5	4.17	
Westpoint	77	28	52.6	2.10	
Woodstock	85	27	53.6	1.28	T.
Wytheville	81	24	53.0	1.33	T.
Washington.					
Aberdeen	87	30	49.2	3.06	
Anacortes	.....	.....	.....	2.15	
Ashford	.....	.....	.....	4.13	4.2
Bremerton	86	32	51.4	1.87	T.
Brinnon	78	32	50.4	2 75	
Cedar Lake	.....	.....	.....	5.84	T.
Cedonia	77	29	49.5	1.41	1.0
Centerville	78	26	49.4	0.66	T.
Chehalis	85	30	52 0	1.64	T.
Clearwater	84	29	49.4	6.82	
Cle Elum	81	20	46.4	1.00	T.
Colfax	88	28	50.7	1.54	T.
Colville	85	26	50.6	0 71	
Conconully	79	23	49.8	1.22	
Coupeville	76	33	51.6	1.74	T.
Crescent	83	26	49.8	0.71	T.
Dayton	79	27	49.9	1.06	
Ellensburg	92	23	50.6	0.50	
Ellensburg (near)	84	24	51.4	0.35	T.
Grandmound	83	31	51.0	1.95	
Granite Falls	.....	.....	.....	4.65	2.0
Hooper	82	27	52.4	1.43	
Lacenter	85	30	51.5	2.15	T.
Lakeside	80	32	54.4	0.82	
Lind	83	26	53.8	1.47	3.0
Loomis	85	28	56.0	T.	
Mayfield	85	26	45.4	4.22	T.
Montecristo	77	21	46.8	4.96	11.0
Mottinger Ranch	84	32	56.8	1.05	
Mount Pleasant	83	34	52.0	2.66	
Moxee Valley	84	21	51.4	0.73	
New Whatcom	74	30	50.0	2.82	
Northport	86	22	49.6	1.11	T.
Olga	71	33	48.3	1.88	
Olympia	84	30	50.6	1.84	
Pasco	90	24	55.7	0.35	
Pinehill	90	27	54.2	0.77	T.
Pomeroy	78	31	53.2	2.40	T.
Port Townsend	76	34	50.8	0.88	
Pullman	78	26	48.9	3.50	4.0
Republic	87	22	48.5	0.74	T.
Ritzville	.....	.....	.....	1.18	5.0
Rosalia	77	27	51.8	1.26	2.5
Sedro	79	27	50.2	3.05	T.
Shoalwater Bay [10]	80	40	51.5	.....	.....
Silvana	78	26	49.8	3.80	
Snohomish	73	29	52.4	2.66	
Snoqualmie	.....	.....	.....	3.85	
Southbend	90	31	52.4	5.09	
Sprague	.....	.....	.....	1.44	2.0
Sunnyside	82	24	52.6	1.01	
Union	81	30	49.9	2.74	
Vancouver	85	31	51.2	2.13	
Vashon	75	32	50.0	1.54	
Waterville	80	24	47.4	1.41	
Wenatchee (near)	83	26	50.0	0.82	
Westsound	75	30	50.4	1.49	
Wilbur	82	28	49.6	0.53	T.
West Virginia.					
Beckley	74	22	49.9	0.43	
Beverly	82	18	49.8	1.70	1.0
Bluefield	78	23	51.9	1.23	T.
Buckhannon *b*	79	19	50.2	1.58	
Burlington	83	25	52.0	0.85	T.
Cairo	82	20	48.0	.....	
Central	82	18	51.2	1.08	T.
Charleston	.....	.....	.....	1.28	
Dayton	81	16	50.5	1.39	T.
Eastbank	82	25	55.4	1.11	
Elkhorn	80	25	53.4	1 20	T.
Fairmont	.....	.....	.....	1.38	T.
Glenville	84	20	52.5	1.35	
Grafton	80	20	51.0	1.66	T.
Green Sulphur Springs	80	21	51.3	0.75	
Harpers Ferry	.....	.....	.....	1.62	
Hinton *a*	.....	.....	.....	1.56	T.
Hinton *b*	81	26	53.0	.....	
Huntington	88	23	55.1	1.02	
Marlinton	76	21	48.2	2.25	T.
Martinsburg	79	28	52.1	1.60	
Morgantown	82	20	50.7	1.51	T.
New Martinsville	82	22	53.2	1.42	
Nuttallburg	80	20	53.2	1.46	T.
Oceana	83	23	52.4	1.29	
Oldfields	83	22	52.6	1.42	
Parsons	78	22	48.8	2.05	
Philippi *a*	81	21	52.2	1.15	.....
Point Pleasant	88	23	54.4	0.86	T.
Romney	83	27	52.8	1.26	T.
Rowlesburg	.....	.....	.....	1.05	2.0
Spencer	86	19	53.6	1.08	T.
Uppertract	81	20	51.0	0.75	
Wellsburg	76	21	49.4	2.10	2.0
Weston *a*	.....	.....	.....	1.67	
Weston *b*	82	21	53.6	.....	
Wheeling *a*	.....	.....	.....	1.92	0.2
Wheeling *b*	83	26	56.6	1.76	T.
Wisconsin.					
Amherst	79	22	47.2	2.95	6.0
Antigo	88	13	46.1	2.16	7.0
Ashland	.....	.....	.....	2.50	T.
Barron	82	12	47.4	1.11	.....
Bayfield	75	11	44.4	3.00	.....
Beloit	77	25	49.0	2.10	6.0
Brodhead	82	25	49.4	2.21	7.0
Butternut	80	13	45.6	0.96	T.
Citypoint	80	19	50.3	3.69	6.5
Delavan	83°	24°	47.6°	1.18	5.0
Dodgeville	81	24	49.0	2.52	4.0
Easton	82	18	49.0	1.69	6.0
Eau Claire	84	21	50.6	2.95	2.5
Florence	80	15	45.6	3.84	1.5
Fond du Lac	83	20	47.9	2.09	10.0
Grand River Locks	.....	.....	.....	2.24	3.5
Grantsburg	83	16	49.9	1.19	T.
Hartford	82	22	47.8	2.53	10.0
Hartland	79	19	47.9	2.84	8.0
Harvey	80	25	50.4	2.31	4.8
Hayward	78	15	49.0	2.45	.....
Hesford	81	12	45.3	2.90	3.0
Hillsboro	80	20	47.7	3.50	5.0
Knapp	80	17	48.3	2.00	T.
Koepenick [1]	78	24	46.4	4.30	10.0
Lancaster	80	23	49.4	3.63	3.0
Madison	76	24	48.0	1.68	5.0
Manitowoc	76	25	44.8	2.70	4.5
Meadow Valley	82	21	48.6	3.38	7.0
Medford	83	12	45.4	2.95	2.0
Menasha	.....	.....	.....	2.43	10.0
Neillsville	80	20	48.0	3.21	4.0
New Holstein	85	22	50.9	3.25	9.0
New London	81	21	46.7	3.05	8.0
North Crandon	.....	.....	.....	0.85	4.0
Oconto	83	21	45.8	2.77	5.0
Osceola	82	15	48.8	1.95	0.5
Oshkosh	76	28	47.7	2.45	10.0
Pepin	83	20	50.4	2.75	3.0
Pine River	83	19	47.8	2.36	7.0
Portage	81	23	48.6	2.09	7.0
Port Washington	79	22	45.4	3.75	7.0
Prairie du Chien *a*	84	24	51.7	3.19	4.0
Prairie du Chien *b*	.....	.....	.....	1.83	3.2
Prentice	77	14	47.4	3.46	2.0
Racine	75	28	47.1	0.83	.....
Sharon	80	24	48.9	2.94	7.0
Shawano	81	20	46.3	2.16	3.0
Sheboygan	74	25	43 7	3.12	9.2
Spooner	80	15	50.8	1.90	.....
Stevens Point	80	21	46.6	3.04	8.0
Sturgeon Bay Canal [9]	65	20	41.0	.....	.....
Two Rivers	66	22	44.6	.....	.....
Valley Junction	80	20	48.8	3.79	5.5
Viroqua	79	23	50.1	3.63	3.5
Watertown	81	24	47.8	2.76	11.5
Waukesha	80	24	46.6	2.34	4.3
Waupaca	81	20	47.2	2.74	.....
Wausau	78	21	46.6	3.13	6.0
Wausaukee	83	20	46.3	2.47	.....
Westfield	80	21	47.2	1.01	3.0
Whitehall	79	22	48.7	2.96	4.0
Wyoming.					
Alcova	82	15	46.2	3.01	19.4
Basin	82	16	45.2	1.06	
Bedford	71	19	42.0	1.48	10.2
Bitter Creek	85	8	45.6	3.10	22.0
Buffalo	77	14	47.4	4.64	13.0
Burlington	80	25	48.5	3.10	.....
Burns	66	10	37.8	1.83	18.0
Carbon	70	0	41.8	3.44	13.0
Centennial	65	— 9	33.9	8.63	74.5
Cody	70	28	44.2	2.27	
Dome Lake	51	2	30.2	.....	51.0
Douglas	85	3	45.1	4.56	6.0
Embar	71	20	46.0	7.36	42.0
Evanston	67	18	37.2	2.23	7.7
Fort Laramie	83	14	47.3	7.48	4.5
Fort Washakie	73	9	43.6	6.81	42.0
Fort Yellowstone	66	21	42.0	1.93	7.5
Fourbear	68	12	39.7	6.24	49.4
Hyattville	79	25	47.5	.....	.....
Iron Mountain	72	4	40.0	5.80	.....
Kimball Ranch	76°	24°	48.1°	5.75	7.5
Laramie	65	—10	36.0	2.91	26.7
Lovell	83	21	49.2	1.82	2.0
Lusk	76	7	44.0	3.46	.....
Parkman	74	17	45.9	4.77	7.0
Pinebluff	76	12	48.5	5.64	.....
Rawlins	68	10	42.2	2.89	.....
Saratoga	70°	11°	39.6°	1.59	.....
Sheridan	80	.....	.....	4.18	1.0
Sherman	.....	.....	.....	9.50	95.0
Thayne	69	21	41.6	1.73	4.4
Thermopolis	74	21	46.0	5.32	.....
Cuba.					
Aguacate	94	49	75.9	3.73	
Anstralia	95	59	77.7	3.35	
Banaguises	94	53	76.2	4.12	
Batabano	97	55	79.0	0.00	
Camajuani	98	53	75.0	1.43	
Cardenas	91	59	77.6	1.05	
Cruces	.....	.....	.....	3.09	
Guabairo	.....	.....	.....	2.43	
Guanajay	89	67	82.0	3.86	
Guines	90	69	79.6	3.21	
Holguin	94	57	76.6	5.95	
Manzanillo	88	70	80.4	0.76	
Matanzas	93	53	76.0	0.22	

TABLE II.—*Climatological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Cuba—Cont'd.	°	°	°	*Ins.*	*Ins*
Moron Trocha	95	54	77.0	0.46	
Nuevitas	98*	60	79.1*	1.47	
Pinar del Rio	92	58	76.3	1.35	
Sagua la Grande	96	50	72.9	0.00	
Santa Clara	95	50	77.2	1.51	
Soledad	92	42	73.8	0.49	
Union de Reyes	91	59	78.5	5.08	
Puerto Rico.					
Adjuntas	89	51	71.0	12.29	
Aguadilla	88	72	79.8	5.31	
Arecibo	91	60	75.2	5.38	
Bayamon	95	61	77.2	9.33	
Caguas	89	61	75.6	7.42	
Canovanas	94	66	78.0	9.49	
Cayey	89	56	74.4	18.30	
Coamo	95	61	78.2	5.10	
Corozal	93	60	75.6	9.17	
Fajardo	89	65	78.6	13.77	
Hacienda Coloso	93	58	77.6	7.00	
Hacienda Perla	89	63	76.6	23.08	
Humacao	89	67	78.4	10.89	
Isabela	96	64	77.9	4.50	
La Isolina	88	61	74.2	4.10	
Lajas	93	61	78.6	1.10	
Manati	96	60	77.6	5.36	
Maunabo	85	69	79.0	3.48	
Mayaguez	92	62	77.9	5.44	
Morovis	94	61	77.5	6.24	
Ponce	92	59	77.2	2.72	
Port America	90	65	79.6	4.89	
Puerta de Tierra	93	69	78.8	6.62	
San German	88	56	72.9	1.81	
San Lorenzo	91	59	76.6	13.00	
Utuado	94	.....	.....	2.09	
Vieques	88	69	78.4	9.78	
Yanco	96	61	79.4	0.91	
Mexico.					
Ciudad P. Diaz	97	41	69.[illegible]	6.29	
Coatzacoalcos	100	60	80.2	1.48	
Guanajuato	88	48	66.2	0.14	
Leon de Aldamas	89	44	66.0	T.	
Puebla	83	55	68.0	0.02	
Tampico	97	60	77.0	0.28	
Topolobampo *[1]	87	55	67.8	T.	
Vera Cruz	91[a]	68	79.4[b]	0.30	
New Brunswick.					
St. John	63	24	39.8	4.16	9.5
Nicaragua.					
Rivas	96	78	85.9	0.02	

Late reports for March, 1900.

Alabama.					
Livingston *a*	80	28	52.2	.....	
Alaska.					
Coal Harbor	48	5	31.5	4.01	1.0
Juneau	61	— 5	33.8	3.06	2.0
Killisnoo	50	— 2	32.1	2.40	3.0
Orca	57	10	35.8	15.74	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alaska—Cont'd.	°	°	°	*Ins.*	*Ins.*
Skagway	63	—10	29.4	1.15	1.5
Wood Island	51	18	37.9	7.46	7.0
Arkansas.					
Russellville	83	20	53.6	3.77	1.2
California.					
Glendora	.....	.....	.....	2.13	
Colorado.					
Rangely	.....	13	.....	0.00	
Delaware.					
Milford	.....	.....	.....	4.52	3.0
Florida.					
Hypoluxo	85	47	70.6	2.79	
Illinois.					
Monticello	62	0	35.6	1.58	
Paris	67	3	38.9	1.63	T.
Strawn	57	0	31.6	2.11	.....
Winchester	66	6	36.4	0.13	0.2
Iowa.					
Council Bluffs	77	— 4	35.0	.....	.....
Mount Vernon *a* *[1]	58	— 3	29.2	.....	.....
Primghar	76	—10	30.4	4.13	.....
Maryland.					
Denton	62	11	39.6	1.31	7.0
Van Bibber	59	8	35.6	.....	.....
Montana.					
Billings	73	— 2	38 0	.....	.....
Butte	61	1	37.6	1.30	12.0
Ekalaka	69	—11	31.4	0.80	9.0
New York.					
Brentwood	58	8	34.3	3.95	8.0
North Lake	45	—25	16.8	9.12	66.5
North Carolina.					
Greenville	72	25	48.7	4.11	
Mountairy	71	8	42.6	.....	
Washington	84	24	50.1	3.19	T.
Oregon.					
Tillamook	.....	.....	.....	4.50	
South Carolina.					
Cheraw *a*	.....	25	.....	4.65	
South Dakota.					
Gannvalley	.....	....	.....	1.80	13.0
Howard	72	—15	30.2	.....	.....
Texas.					
Beaumont	88	25	60.4	2.00	
Sherman	84	26	55.2	0.96	
Utah.					
Bluecreek *[1]	70	20	42.2	0.20	1.0
Vermont.					
Cornwall	45	— 7	21.6	.....	.....
Virginia.					
Manassas	62	6	39.0	1.36	8.0
Wisconsin.					
Beloit	54	— 2	27.2	1.05	7.5
Wausaukee	52[d]	—10[e]	24.0[d]	0.56	5.0
Wyoming.					
Dome Lake	46	— 3	22.0	2.40	24.0
Parkman	73	— 5	35.6	0.75	.....
Cuba.					
Guines	80	64	72.2	0.64	
Mexico.					
Guanajuato	85	42	62.6	1.64	

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus: [c]

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.

[2] Mean of 8 a. m. + 8 p. m. ÷ 2.

[3] Mean of 7 a. m. + 7 p. m. ÷ 2.

[4] Mean of 6 a. m. + 6 p. m. ÷ 2.

[5] Mean of 7 a. m. + 2 p. m. ÷ 2.

[6] Mean of readings at various hours reduced to true daily mean by special tables.

[7] Mean from hourly readings of thermograph.

[9] Mean of sunrise and noon.

[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance "a" denotes 14 days missing.

No note is made of breaks in the continuity of temperature records when the same do not exceed two days. All known breaks, of whatever duration, in the precipitation record receive appropriate notice.

CORRECTION.

March, 1900, New York, Canton, make total precipitation 4 73 instead of 4.31.

TABLE III.—*Mean temperature for each hour of seventy-fifth meridian time, April*, 1900.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midn't.	Mean.
Bismarck, N. Dak....	46.3	44.7	43.4	42.2	40.5	39.6	38.4	39.5	42.3	46.6	51.0	54.5	56.5	58.7	60.3	61.5	62.5	62.6	61.8	59.9	55.1	52.2	50.2	48.3	50.8
Boston, Mass	43.4	42.8	42.4	42.1	41.7	41.9	43.6	46.4	48.7	50.5	51.8	53.2	54.1	54.2	54.6	54.1	53.3	52.1	49.8	48.3	47.1	46.0	45.1	44.5	48.0
Buffalo, N. Y.....	40.7	40.4	40.5	40.3	40.1	39.8	40.5	41.7	42.8	43.8	44.9	46.0	46.2	46.4	46.4	45.9	46.2	45.5	44.7	44.1	42.5	41.9	42.0	41.5	43.1
Cedar City, Utah....	40.9	40.7	39.9	38.7	38.3	38.0	37.2	36.8	34.0	39.6	42.2	44.1	45.4	46.7	47.5	47.9	49.0	48.5	48.1	47.4	45.1	43.0	42.2	41.3	42.7
Chicago, Ill.....	45.6	44.8	44.3	43.9	43.0	42.7	43.1	43.8	44.7	46.0	46.8	47.4	48.0	48.2	48.7	49.0	49.2	49.0	48.7	48.3	47.4	47.0	46.6	46.6	46.4
Cincinnati, Ohio....	50.9	49.6	48.4	47.4	46.4	45.7	45.8	48.0	51.0	53.4	55.9	58.0	59.6	61.2	62.6	63.2	63.5	62.9	61.0	59.0	57.3	55.8	54.0	52.8	54.7
Cleveland, Ohio	45.4	44.4	44.5	43.8	43.1	42.6	43.1	43.9	44.7	45.4	46.3	47.2	47.8	47.9	48.7	49.7	51.0	50.7	49.5	48.8	47.7	47.6	46.7	46.3	46.5
Detroit, Mich.....	44.5	43.8	43.0	42.4	42.2	41.7	42.1	44.1	45.7	47.8	49.6	51.7	52.6	54.3	54.8	54.8	54.1	53.3	51.8	50.0	48.4	47.1	46.1	45.5	48.0
Dodge, Kans.....	49.5	48.8	47.9	47.4	46.6	46.3	45.6	45.1	47.3	51.1	54.6	57.0	58.9	59.9	60.6	61.4	61.3	60.9	60.1	58.0	54.6	53.1	51.4	50.6	53.2
Eastport, Me.....	37.0	36.6	36.1	35.6	35.5	35.8	37.2	38.7	40.4	41.7	43.4	44.3	45.0	44.7	45.8	45.6	43.8	42.5	41.4	41.2	39.9	39.3	38.6	37.9	40.3
Galveston, Tex.....	65.7	65.6	65.4	65.2	65.1	65.0	65.1	65.4	66.1	66.7	68.0	69.1	69.5	69.5	69.4	69.7	69.3	69.0	68.3	67.8	67.0	67.0	66.8	66.5	67.2
Havre, Mont.....	46.6	44.9	43.1	42.2	40.9	39.7	38.9	38.1	39.5	41.9	45.8	49.6	53.5	56.0	57.9	59.2	60.2	60.6	59.8	59.2	56.9	53.2	50.3	48.4	49.4
Independence, Cal..	50.8	50.2	49.0	47.9	47.2	46.1	44.9	44.2	42.9	45.5	48.6	51.2	54.2	56.4	58.6	60.2	60.9	60.6	60.1	59.6	56.8	54.9	53.1	51.7	52.3
Kalispell, Mont	45.0	44.0	42.5	40.8	40.1	38.7	37.6	36.9	37.3	40.4	44.4	48.2	51.3	53.7	55.7	56.7	57.4	58.0	58.0	57.3	55.4	51.9	48.8	46.6	47.8
Kansas City, Mo.....	54.6	53.7	53.1	52.4	51.4	50.8	50.1	50.0	51.9	54.6	57.1	60.0	62.1	63.9	65.0	65.8	65.9	65.2	64.2	62.5	60.2	58.8	57.5	56.1	57.8
Key West, Fla.....	72.0	71.8	71.7	71.5	71.5	71.6	72.5	74.4	75.5	75.9	76.8	77.1	77.3	77.3	77.4	76.7	75.9	75.0	74.2	74.2	73.6	73.5	73.3	73.0	74.3
Marquette, Mich	41.3	41.2	40.1	39.7	39.0	38.9	39.1	41.2	42.1	43.7	45.3	46.0	46.8	47.6	47.7	47.2	47.0	46.8	46.2	44.9	43.3	42.5	42.5	41.8	43.4
Memphis, Tenn.....	58.7	57.9	57.7	56.9	56.2	55.6	55.5	56.2	59.2	61.6	63.7	65.3	66.9	67.8	69.1	69.7	69.6	68.8	67.5	66.6	64.7	63.4	61.8	60.2	62.5
Mt. Tamalpais, Cal..	47.4	47.1	46.6	46.3	46.3	45.8	45.1	45.0	44.4	44.8	45.8	46.9	49.0	50.0	50.9	51.6	52.0	51.9	50.9	49.6	48.6	47.5	47.0	47.3	47.8
New Orleans, La.....	64.7	64.2	63.8	63.7	63.3	62.9	62.9	63.6	63.1	67.3	69.6	71.4	72.7	73.6	74.3	74.5	74.5	73.9	72.2	70.0	68.6	67.2	66.3	65.9	68.2
New York, N. Y.....	46.8	46.2	45.5	45.0	44.6	44.1	44.8	46.5	49.1	51.6	53.4	55.2	56.1	56.5	57.1	56.9	56.4	55.0	53.4	52.1	50.6	49.7	48.5	48.0	50.4
Philadelphia, Pa.....	47.9	47.2	46.9	46.4	46.0	46.1	47.7	49.5	52.0	54.0	55.9	58.0	59.5	61.0	61.6	61.7	60.8	59.3	57.0	55.8	53.2	52.0	50.6	49.7	53.3
Pittsburg, Pa.....	47.9	46.9	45.6	44.8	44.2	44.0	44.4	46.3	49.6	52.8	54.9	56.2	58.0	58.7	59.0	59.4	59.4	58.8	57.1	55.2	53.7	52.0	50.4	49.5	52.0
Portland, Oreg.....	52.1	51.0	50.0	49.3	48.5	47.4	46.4	46.0	44.5	45.3	47.2	49.4	51.8	53.9	55.3	56.7	57.9	58.5	58.7	58.4	57.9	56.1	54.2	53.2	52.1
St. Louis, Mo.....	55.3	54.4	53.4	52.6	51.7	51.0	50.4	51.3	52.7	54.6	57.4	59.8	61.6	63.2	64.7	65.5	65.6	65.2	64.1	62.4	61.1	59.7	58.3	57.1	58.1
St. Paul, Minn.....	48.4	47.4	46.4	45.8	44.9	44.0	43.2	43.1	44.8	47.3	50.5	53.8	56.0	57.9	59.4	60.3	60.8	60.7	59.8	58.3	56.2	53.8	52.1	50.6	51.9
Salt Lake City, Utah.	46.9	46.5	45.7	44.8	44.6	44.0	43.3	43.3	42.0	44.3	46.8	49.8	52.1	53.8	54.0	55.0	54.9	55.5	54.3	53.5	51.7	50.0	48.3	47.4	48.8
San Diego, Cal.....	56.2	55.7	54.9	54.5	54.2	53.9	53.5	52.7	52.8	54.1	56.5	58.1	59.5	60.2	60.9	60.9	60.5	60.8	60.1	59.3	58.6	57.8	57.3	56.8	57.1
San Francisco, Cal...	51.4	51.1	50.6	50.3	50.1	49.7	47.4	50.1	49.1	49.8	51.5	53.4	55.4	56.6	57.5	58.1	57.8	57.5	56.9	55.8	55.0	53.8	52.6	52.2	53.2
Santa Fe, N. Mex ...	41.4	40.6	39.2	38.1	36.9	36.5	35.4	35.9	38.8	41.3	43.2	45.1	46.7	48.4	50.0	50.2	50.9	50.9	50.4	50.0	46.2	43.8	42.7	42.1	43.5
Savannah, Ga.....	62.5	61.8	60.9	60.3	60.0	59.4	59.6	61.6	64.6	67.8	70.3	72.3	73.9	74.3	74.9	74.2	72.5	70.8	68.5	66.9	65.7	65.0	64.3	63.8	66.5
Washington, D. C....	49.5	48.2	47.0	46.4	45.6	45.4	47.1	50.3	52.2	54.6	56.8	58.4	59.9	61.4	62.5	63.1	62.8	62.2	60.3	58.0	56.1	54.6	52.9	51.7	54.5
West Indies.																									
Basseterre, St. Kitts.	75.5	75.5	75.4	75.1	75.0	76.1	77.5	78.2	79.3	79.9	80.6	81.0	80.8	80.2	79.4	78.2	77.4	76.7	76.4	76.7	76.3	76.2	76.1	75.8	77.5
Bridgetown, Bar.....	75.7	75.5	75.3	75.0	75.3	77.3	80.0	81.9	82.8	83.9	84.6	84.7	84.0	83.6	83.0	81.6	79.9	78.9	78.1	77.5	77.2	76.9	76.6	76.3	79.4
Cienfuegos, Cuba *..	72.3	71.2	70.7	70.0	69.0	69.2	70.3	75.8	79.0	81.7	83.5	84.7	84.8	83.8	82.3	81.7	80.6	79.6	78.6	78.0	77.1	76.3	75.0	74.1	77.0
Havana, Cuba.....	71.9	71.0	70.5	70.2	70.0	69.6	70.1	73.1	76.0	78.3	79.8	80.6	80.7	80.4	79.9	79.4	78.6	77.8	76.4	75.5	74.7	74.1	73.3	72.7	75.2
Kingston, Jamaica..	72.1	71.5	71.2	70.9	70.8	70.4	71.6	77.3	80.2	82.0	83.1	83.5	83.5	83.5	82.6	82.2	81.2	79.9	77.7	76.2	74.9	74.0	73.2	72.5	76.9
Port of Spain, Trin..	74.9	74.6	74.3	74.0	73.9	74.6	77.5	81.5	83.1	84.6	85.7	85.9	85.7	85.5	84.7	83.4	81.5	79.2	78.1	77.9	76.9	76.4	76.2	75.6	79.4
P. Principe, Cuba ...	68.4	67.5	66.9	66.7	66.2	65.9	67.2	73.4	75.6	78.4	80.9	83.5	84.7	84.2	83.9	81.6	80.4	77.6	75.0	72.4	71.5	70.6	69.9	69.1	74.3
Roseau, Dominica ..	76.1	75.8	75.6	75.4	75.3	76.5	79.5	80.9	81.7	82.8	83.5	83.9	84.1	84.3	83.3	82.3	80.7	79.3	78.3	77.6	77.2	76.8	76.6	76.6	79.3
San Juan, P. R.....	74.1	73.5	72.7	73.2	73.2	73.7	75.2	78.3	79.4	80.6	81.2	81.3	81.4	80.7	79.8	79.3	78.3	76.8	76.3	76.2	75.6	75.0	74.7	74.3	76.9
Santiago de Cuba...	72.4	71.9	73.4	71.0	70.5	70.4	74.1	76.7	81.3	83.7	85.7	86.0	86.1	85.4	84.4	83.0	81.1	79.4	77.9	77.1	76.3	75.4	74.6	73.9	77.9
Santo Domingo, S. D.	71.7	71.1	70.7	70.3	70.1	70.2	72.5	76.1	78.8	80.9	81.1	82.0	82.0	81.9	81.2	79.9	79.1	77.9	76.4	75.1	74.3	73.5	72.7	72.1	75.9
Willemstad, Curaçao	77.8	77.4	77.2	77.1	77.2	77.1	79.2	80.7	81.7	82.4	83.3	83.7	84.4	84.4	83.8	83.1	81.2	80.0	79.1	78.9	78.6	78.5	78.4	78.3	80.1

*23 days.

TABLE IV.—*Mean pressure for each hour of seventy-fifth meridian time, April*, 1900.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midn't.	Mean.
Bismarck, N. Dak....	28.236	.240	.244	.248	.250	.254	.261	.265	.277	.279	.275	.268	.251	.237	.223	.211	.199	.193	.192	.193	.209	.218	.222	.227	.236
Boston, Mass.....	29.825	.820	.813	.815	.820	.827	.832	.833	.832	.825	.814	.802	.791	.781	.773	.773	.782	.789	.806	.823	.830	.831	.829	.828	.812
Buffalo, N. Y.....	29.188	.185	.184	.186	.192	.202	.217	.218	.222	.224	.230	.211	.203	.195	.186	.182	.178	.179	.184	.186	.189	.187	.187	.186	.195
Cedar City, Utah....	24.115	.112	.112	.108	.102	.099	.096	.099	.110	.117	.121	.127	.128	.121	.111	.101	.093	.085	.082	.084	.088	.098	.110	.114	.106
Chicago, Ill.	29.156	.155	.157	.157	.156	.160	.169	.182	.182	.184	.188	.183	.174	.164	.152	.143	.139	.136	.133	.132	.137	.141	.144	.144	.157
Cincinnati, Ohio	29.369	.368	.369	.369	.372	.379	.391	.396	.393	.392	.384	.374	.359	.348	.334	.328	.328	.329	.331	.336	.354	.357	.360	.360	.362
Cleveland, Ohio	29.214	.214	.214	.216	.224	.233	.241	.247	.250	.252	.248	.242	.231	.222	.210	.203	.197	.196	.200	.209	.211	.208	.205	.206	.221
Detroit, Mich.....	29.243	.237	.240	.241	.245	.253	.262	.270	.272	.275	.272	.265	.253	.244	.231	.223	.222	.221	.225	.234	.235	.237	.234	.233	.244
Dodge, Kans	27.296	.294	.291	.288	.287	.288	.295	.302	.310	.312	.309	.304	.293	.280	.268	.254	.244	.241	.244	.255	.268	.282	.289	.293	.283
Eastport, Me	29.778	.773	.703	.772	.780	.790	.797	.801	.805	.803	.794	.786	.777	.770	.763	.762	.768	.775	.788	.798	.798	.795	.789	.784	.784
Galveston, Tex.....	29.857	.852	.841	.837	.841	.849	.859	.868	.882	.887	.891	.891	.876	.863	.848	.829	.817	.805	.804	.806	.822	.839	.843	.846	.848
Havre, Mont.....	27.296	.302	.304	.302	.300	.303	.308	.314	.322	.324	.323	.323	.317	.308	.297	.285	.276	.269	.267	.267	.270	.278	.286	.289	.297
Independence, Cal..	25.861	.866	.870	.870	.868	.867	.867	.867	.876	.885	.895	.891	.887	.873	.857	.838	.822	.806	.804	.803	.806	.813	.834	.852	.853
Kalispell, Mont	26.853	.860	.864	.869	.871	.872	.877	.884	.889	.894	.894	.892	.881	.869	.856	.841	.827	.819	.814	.818	.813	.826	.841	.846	.857
Kansas City, Mo.....	28.955	.951	.948	.950	.949	.950	.958	.973	.977	.981	.984	.977	.963	.946	.931	.917	.906	.906	.910	.919	.929	.941	.946	.947	.946
Key West, Fla.....	29.992	.982	.973	.971	.974	.981	.995	.007	.016	.018	.019	.009	.996	.980	.964	.948	.943	.939	.946	.962	.976	.985	.986	.986	.981
Marquette, Mich	29.266	.268	.271	.270	.274	.283	.295	.302	.295	.294	.290	.285	.277	.268	.255	.251	.248	.246	.246	.250	.258	.257	.260	.263	.270
Memphis, Tenn.....	29.561	.555	.553	.553	.559	.568	.580	.594	.598	.608	.600	.596	.580	.569	.546	.534	.527	.520	.518	.523	.537	.544	.545	.551	.559
Mt. Tamalpais, Cal .	27.503	.502	.502	.499	.490	.484	.478	.476	.482	.494	.504	.514	.526	.529	.527	.525	.516	.506	.500	.495	.486	.487	.498	.505	.501
New Orleans, La.....	29.920	.910	.901	.899	.908	.910	.925	.938	.945	.952	.953	.948	.937	.917	.902	.888	.880	.878	.878	.883	.896	.905	.908	.905	.912
New York, N. Y.....	29.662	.657	.655	.655	.660	.668	.677	.678	.676	.671	.655	.642	.625	.612	.598	.596	.600	.608	.626	.642	.653	.655	.660	.660	.645
Philadelphia, Pa.....	29.908	.908	.899	.898	.904	.916	.922	.928	.922	.918	.908	.894	.879	.866	.853	.848	.851	.854	.867	.881	.893	.895	.902	.902	.892
Pittsburg, Pa.....	29.129	.123	.125	.130	.134	.145	.155	.158	.157	.156	.146	.135	.122	.109	.096	.089	.086	.087	.093	.103	.114	.116	.118	.118	.136
Portland, Oreg.....	29.870	.873	.878	.879	.876	.876	.876	.879	.883	.892	.895	.895	.892	.886	.876	.871	.864	.856	.849	.846	.844	.848	.859	.869	.872
St. Louis, Mo.....	29.381	.376	.376	.374	.376	.384	.397	.408	.416	.416	.416	.406	.398	.383	.368	.356	.348	.343	.342	.346	.360	.369	.371	.372	.378
St. Paul, Minn.....	29.127	.128	.125	.128	.130	.133	.140	.149	.152	.150	.150	.144	.134	.122	.112	.104	.097	.092	.089	.090	.100	.110	.116	.120	.123
Salt Lake City, Utah.	25.484	.485	.483	.478	.574	.473	.478	.476	.488	.496	.498	.499	.498	.489	.479	.473	.465	.460	.457	.458	.460	.467	.479	.484	.478
San Diego, Cal.....	29.881	.881	.879	.874	.865	.861	.859	.861	.871	.882	.892	.897	.900	.895	.889	.881	.872	.864	.856	.859	.860	.867	.876	.885	.876
San Francisco, Cal...	29.849	.850	.848	.843	.837	.833	.831	.832	.843	.853	.860	.866	.871	.870	.864	.856	.847	.837	.831	.828	.827	.829	.842	.851	.845
Santa Fe, N. Mex ...	23.135	.135	.133	.126	.121	.119	.118	.120	.129	.135	.137	.139	.130	.119	.105	.099	.096	.092	.085	.090	.101	.114	.123	.129	.117
Savannah, Ga.....	29.952	.946	.945	.947	.954	.965	.983	.990	.996	.997	.993	.979	.962	.944	.924	.916	.912	.912	.919	.928	.940	.945	.943	.943	.951
Washington, D. C....	29.919	.917	.917	.917	.927	.937	.948	.949	.949	.947	.938	.926	.906	.888	.870	.860	.860	.850	.868	.883	.893	.898	.901	.908	.908
West Indies.																									
Basseterre, St. Kitts.	29.935	.933	.917	.921	.935	.951	.972	.981	.986	.982	.972	.954	.937	.922	.914	.914	.919	.930	.947	.962	.970	.970	.962	.949	.947
Bridgetown, Bar....	29.900	.892	.893	.898	.911	.924	.937	.945	.947	.940	.928	.909	.889	.877	.869	.871	.878	.891	.907	.928	.931	.933	.926	.913	.910
Cienfuegos, Cuba *..	29.880	.869	.860	.860	.868	.880	.900	.910	.914	.914	.905	.893	.878	.858	.845	.833	.834	.845	.856	.874	.889	.898	.897	.893	.877
Havana, Cuba.....	29.924	.914	.904	.903	.910	.919	.934	.947	.951	.953	.950	.940	.928	.909	.891	.880	.879	.885	.896	.906	.921	.930	.932	.927	.918
Kingston, Jamaica..	29.632	.618	.608	.609	.618	.633	.654	.664	.668	.664	.651	.634	.613	.594	.582	.573	.576	.586	.606	.623	.636	.647	.649	.641	.624
Port of Spain, Trin..	29.853	.844	.843	.849	.860	.875	.891	.900	.900	.891	.874	.852	.825	.809	.802	.805	.815	.835	.853	.865	.878	.882	.876	.865	.856
P. Principe, Cuba ...	29.617	.604	.598	.602	.612	.626	.642	.652	.656	.657	.647	.632	.613	.594	.582	.578	.582	.595	.610	.622	.635	.640	.635	.626	.619
Roseau, Dominica ..	29.909	.902	.901	.905	.915	.927	.940	.954	.957	.953	.941	.925	.906	.893	.885	.883	.891	.902	.914	.930	.939	.940	.934	.922	.919
San Juan, P. R.....	29.885	.878	.870	.876	.886	.900	.918	.923	.925	.923	.913	.895	.876	.861	.852	.851	.859	.876	.889	.903	.911	.911	.906	.895	.890
Santiago de Cuba...	29.853	.840	.834	.839	.849	.861	.878	.886	.892	.887	.871	.855	.833	.814	.803	.790	.809	.820	.837	.855	.872	.877	.874	.865	.850
Santo Domingo, S. D.	29.921	.905	.899	.898	.911	.930	.948	.963	.969	.962	.950	.933	.913	.891	.877	.868	.877	.893	.909	.928	.939	.948	.946	.934	.921
Willemstad, Curaçao	29.799	.789	.783	.789	.801	.815	.835	.846	.847	.841	.824	.804	.770	.752	.733	.726	.731	.748	.776	.796	.815	.826	.826	.813	.795

*23 days.

TABLE V.—*Average wind movement for each hour of seventy-fifth meridian time, April, 1900.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex	10.3	10.6	10.3	9.7	8.5	7.9	8.7	8.9	8.7	8.9	9.7	10.4	11.0	11.1	11.2	11.2	12.1	12.2	12.0	10.3	8.9	8.9	10.1	10.4	10.1
Albany, N. Y.	5.7	5.9	6.3	6.2	5.4	5.7	6.0	7.2	8.5	8.7	9.8	10.5	11.6	12.2	12.4	12.3	12.3	10.6	8.7	8.1	7.3	6.3	5.7	5.4	8.3
Alpena, Mich.	6.9	6.7	7.7	8.1	8.5	8.1	8.8	9.3	10.4	11.0	10.6	11.1	11.0	10.8	11.1	10.5	9.8	9.2	8.4	7.0	5.7	5.8	6.5	6.5	8.7
Amarillo, Tex.	14.8	15.1	14.5	14.7	14.9	14.7	14.5	14.2	15.3	17.0	19.6	20.1	21.0	19.1	20.2	20.6	19.7	21.1	19.7	18.1	17.2	17.6	17.0	16.3	17.4
Atlanta, Ga.	10.2	9.3	8.7	8.6	8.7	8.3	8.2	8.6	8.9	9.2	9.9	10.2	10.0	10.6	11.2	11.6	11.9	11.6	10.6	10.1	11.0	11.0	10.1	10.0	9.9
Atlantic City, N. J.	11.1	10.4	9.3	8.4	8.4	8.7	9.8	11.3	11.9	11.9	12.1	12.8	13.7	13.7	13.5	13.2	13.3	13.3	12.1	11.7	11.3	11.2	11.5	11.5	11.5
Augusta, Ga.	5.1	4.8	4.6	4.1	4.2	4.4	3.9	4.4	5.6	6.5	6.8	7.2	8.9	9.5	9.4	8.7	8.6	8.3	7.1	6.3	5.7	5.3	5.8	5.6	6.3
Baker City, Oreg.	6.0	6.7	7.4	6.9	6.7	6.2	6.0	5.9	6.2	6.5	6.9	7.1	7.1	11.1	11.4	11.7	12.5	12.7	11.7	11.1	9.4	8.7	7.7	7.1	8.6
Baltimore, Md.	3.5	4.2	4.1	3.6	3.7	3.4	3.6	4.9	5.6	5.3	6.0	6.6	9.5	7.5	6.9	6.9	6.4	5.8	4.2	3.6	4.0	4.6	4.0	3.8	5.0
Bismarck, N. Dak.	9.2	8.6	8.3	7.7	7.0	6.7	6.3	6.5	7.9	9.9	11.0	12.2	13.7	14.2	14.2	13.9	13.8	13.7	13.3	11.2	9.0	8.7	8.7	8.6	10.2
Block Island, R. I.	14.0	13.3	14.0	13.8	14.1	13.8	14.4	14.7	14.6	14.1	14.2	15.5	16.9	16.8	17.7	18.9	17.3	18.1	18.2	18.0	16.5	15.5	14.3	13.6	15.5
Boise, Idaho	5.1	5.2	5.5	5.4	4.8	4.9	4.9	4.6	4.6	5.0	5.6	6.7	8.4	8.4	9.2	9.9	10.6	10.1	10.4	9.9	8.1	6.9	5.8	5.1	6.9
Boston, Mass.	9.4	9.4	9.4	9.3	9.6	9.7	10.5	11.8	12.4	12.1	12.2	12.1	12.4	12.7	13.1	14.3	14.3	13.3	11.9	11.4	11.6	11.3	10.6	10.1	11.5
Buffalo, N. Y.	10.6	10.9	10.7	10.7	11.6	11.6	11.4	11.9	13.1	13.8	14.4	14.3	14.8	14.7	14.2	14.2	14.3	13.4	11.9	12.1	11.8	11.9	11.1	10.3	12.5
Cairo, Ill.	6.9	7.5	6.8	6.7	6.4	6.9	6.8	7.7	8.3	8.9	10.6	11.0	11.3	11.0	10.9	11.2	11.2	10.7	12.7	8.2	7.9	7.4	7.2	6.9	8.7
Cape Henry, Va.	12.2	12.1	11.8	12.0	11.4	10.8	10.8	12.0	13.3	12.9	12.9	13.2	12.9	12.8	11.7	11.5	11.2	10.1	8.9	8.8	9.4	10.5	11.0	11.6	11.5
Carson City, Nev.	8.0	7.0	7.5	5.8	5.8	5.0	5.2	5.7	6.7	6.4	6.8	6.8	9.2	9.2	11.9	11.8	12.5	12.8	11.8	12.5	12.2	10.4	8.4	8.4	8.8
Cedar City, Utah.	5.9	6.0	5.7	5.1	5.0	5.2	5.7	5.6	5.4	5.2	5.0	5.3	7.5	7.5	8.8	9.2	9.9	10.6	9.1	8.8	6.8	5.8	5.7	6.1	6.6
Charleston, S. C.	9.8	9.2	10.1	10.0	9.4	9.1	9.2	10.2	10.8	11.9	12.7	12.3	13.9	14.6	12.0	14.2	14.3	13.9	13.1	10.9	9.3	9.0	9.5	10.3	11.1
Charlotte, N. C.	6.3	5.9	5.5	5.5	5.4	5.8	5.8	6.4	7.6	8.1	7.9	7.6	7.5	8.4	8.8	8.6	8.2	7.8	6.4	6.1	6.6	6.6	6.5	6.5	7.9
Chattanooga, Tenn.	4.3	4.3	4.3	4.2	4.5	5.1	5.3	5.3	6.3	6.4	7.4	7.5	8.0	8.5	9.1	10.3	10.6	9.4	8.7	6.6	6.2	5.2	4.4	4.4	6.6
Cheyenne, Wyo.	7.3	7.0	7.3	7.4	7.6	7.1	8.0	7.7	8.3	8.4	10.3	10.7	10.6	11.7	12.0	12.0	12.4	11.6	12.0	10.9	9.1	9.1	7.8	8.2	9.3
Chicago, Ill.	17.3	16.8	17.0	16.7	16.6	16.4	16.9	16.6	16.0	15.8	16.8	16.0	17.9	17.8	18.5	18.1	18.3	18.8	19.0	18.4	18.2	17.3	17.2	17.5	17.3
Cincinnati, Ohio.	7.1	6.8	6.3	6.1	5.8	5.6	5.7	6.4	7.6	7.6	9.1	9.8	11.2	11.4	11.2	11.8	11.4	11.5	10.4	9.3	9.1	8.7	8.2	7.9	8.7
Cleveland, Ohio	13.0	12.0	12.2	12.8	12.9	13.9	13.7	14.0	14.3	14.1	15.2	15.4	15.4	14.9	14.4	13.6	13.6	13.1	13.0	13.1	13.1	13.1	12.5	12.4	13.6
Columbia, Mo.	8.6	8.6	8.0	7.6	8.1	8.0	8.2	8.8	9.1	10.4	10.7	10.9	11.2	11.4	11.7	11.9	11.4	10.9	10.2	9.4	8.7	8.3	8.7	8.3	9.6
Columbus, Ohio	7.3	7.1	6.4	6.4	6.6	6.4	6.1	6.9	8.1	9.9	10.2	10.3	10.7	11.4	11.5	11.4	11.7	10.2	8.5	7.8	7.7	7.4	7.0	7.2	8.4
Concordia, Kans.	7.1	6.6	6.8	6.5	6.8	6.8	6.2	6.4	7.9	10.3	11.4	11.6	11.4	11.6	11.7	11.9	12.3	10.3	7.7	6.5	6.9	6.7	7.0	7.0	8.4
Corpus Christi, Tex	15.2	14.1	13.1	13.1	12.4	11.8	11.5	11.2	11.1	12.4	13.5	13.6	14.7	14.6	14.7	14.9	16.1	16.4	16.0	17.3	16.5	16.2	16.6	16.2	14.6
Davenport, Iowa.	6.9	7.1	6.8	7.2	6.5	6.5	6.9	7.3	7.9	8.8	10.1	10.5	10.6	10.7	10.8	10.6	10.5	9.8	8.9	8.9	7.1	6.6	7.1	7.0	7.5
Denver, Colo.	7.3	8.3	8.0	8.1	8.5	8.7	9.0	8.2	8.0	7.9	8.2	9.6	10.1	8.7	9.5	9.9	9.9	10.7	10.1	10.9	10.4	9.2	8.7	8.3	8.8
Des Moines, Iowa	7.6	7.3	7.4	7.5	7.9	7.0	7.2	7.4	8.5	9.3	10.2	10.8	11.2	10.6	11.0	12.3	12.3	12.9	12.1	11.5	9.6	8.8	8.4	7.7	9.3
Detroit, Mich.	8.1	8.4	8.2	8.7	8.8	8.8	8.9	8.9	9.7	10.8	12.1	14.0	15.7	15.4	16.3	17.4	18.0	17.0	15.6	15.4	14.3	14.8	11.2	7.9	13.0
Dodge, Kans.	11.3	11.2	11.4	10.4	9.8	9.5	9.5	9.9	10.8	12.1	14.0	15.7	16.3	15.4	16.3	17.4	18.0	17.0	15.6	15.4	14.3	14.8	11.2	6.9	13.0
Dubuque, Iowa.	5.0	5.0	4.6	4.5	4.7	4.7	4.2	4.2	4.7	6.0	8.1	9.7	10.3	10.5	11.0	11.1	10.8	10.6	9.6	8.5	7.4	7.3	6.9	6.4	7.3
Duluth, Minn.	7.6	7.5	7.9	9.1	9..0	8.3	9.3	9.3	10.2	10.2	11.8	12.5	12.6	12.9	12.9	13.6	13.1	12.8	12.7	11.8	10.3	9.3	8.6	8.0	10.4
Eastport, Me.	9.9	10.0	10.1	10.0	10.0	10.6	10.7	11.6	11.1	11.9	11.9	13.3	13.6	13.6	12.9	13.7	14.0	13.2	12.1	10.4	9.2	8.6	8.4	8.3	11.2
Elkins, W. Va.	3.3	3.2	2.8	3.0	3.1	2.7	3.3	3.5	4.3	4.8	6.8	6.8	7.7	8.1	8.3	8.7	8.5	7.9	7.8	6.1	4.9	4.3	4.0	3.8	5.2
El Paso, Tex.	11.7	11.2	11.1	11.7	11.4	11.2	11.2	11.0	10.8	10.1	11.1	12.0	13.4	14.7	15.7	16.2	17.0	18.1	18.8	18.9	18.2	16.1	12.9	11.9	13.6
Erie, Pa.	8.8	9.2	8.8	8.8	8.7	8.7	8.7	8.8	8.7	9.9	11.4	11.4	11.6	12.0	11.7	11.1	10.7	9.8	9.2	8.5	7.9	7.7	8.1	8.6	8.8
Escanaba, Mich.	6.2	5.9	5.6	6.0	62.	6.2	5.8	6.5	6.2	6.4	6.4	7.2	8.2	9.5	10.0	10.3	10.3	10.3	9.7	8.7	7.7	6.5	6.7	6.5	7.5
Eureka, Cal.	8.5	7.3	7.0	6.6	6.3	5.9	5.5	6.2	5.6	5.0	5.3	6.5	8.9	8.4	10.9	10.3	15.7	16.2	16.5	15.7	6.5	13.2	11.5	9.9	9.6
Evansville, Ind.	6.6	6.7	6.3	6.6	6.3	7.0	6.1	7.2	7.4	8.0	8.7	9.3	9.0	9.4	10.6	11.0	10.9	10.2	9.2	7.8	6.5	6.1	6.6	6.4	7.7
Fort Smith, Ark.	6.1	5.8	6.3	5.8	6.0	6.1	6.2	6.5	6.8	7.7	7.9	8.6	13.4	13.9	14.5	14.2	14.3	14.5	13.6	13.1	11.8	12.2	12.1	12.2	12.2
Fort Worth, Tex.	12.0	11.6	10.6	11.5	10.7	10.2	10.2	10.7	11.2	11.8	12.7	13.5	13.4	13.9	14.5	14.2	14.3	14.5	13.6	13.1	11.8	12.2	12.1	12.2	12.4
Fresno, Cal.	6.7	6.2	5.8	5.3	5.1	4.9	4.4	4.3	4.6	4.9	5.8	7.0	7.5	10.9	11.2	12.1	13.1	11.5	11.8	8.3	8.0	6.9	6.8	5.8	6.5
Galveston, Tex.	9.3	9.2	9.5	9.2	9.1	9.8	9.7	10.2	10.1	10.6	10.8	10.3	10.9	11.4	11.1	11.2	11.5	11.8	12.2	11.6	10.6	9.7	9.7	9.5	9.6
Grand Haven, Mich.	8.0	8.7	8.3	8.1	8.2	8.1	8.0	7.6	8.9	9.6	10.0	10.6	11.4	10.6	11.1	11.4	11.5	11.8	11.1	10.1	9.4	9.0	8.8	9.0	8.5
Grand Junction, Colo.	5.6	5.4	5.1	5.4	5.5	5.4	5.5	5.8	5.8	6.8	7.3	8.3	9.1	7.5	7.3	7.3	8.1	8.3	8.4	8.1	7.8	6.2	8.0	7.4	6.9
Green Bay, Wis.	7.0	6.8	6.6	6.4	6.5	6.0	6.2	6.4	7.4	7.8	7.7	8.2	9.3	8.3	9.0	9.5	10.8	10.0	9.0	8.0	6.9	6.9	8.0	7.4	7.6
Harrisburg, Pa.	5.9	5.8	6.0	5.9	5.5	5.4	5.7	7.0	8.1	8.8	9.1	9.7	10.3	10.9	11.5	12.3	12.3	12.7	12.7	13.3	13.0	12.3	12.3	11.5	10.9
Hatteras, N. C.	12.2	12.8	13.9	13.5	13.2	12.7	12.5	12.5	13.2	13.8	13.7	13.8	14.0	12.4	13.0	14.2	14.1	13.6	13.9	13.3	12.3	10.6	8.0	6.8	7.1
Havre, Mont.	8.0	8.2	7.7	7.8	7.5	6.9	7.4	7.3	8.3	8.3	8.9	9.1	9.7	10.3	10.9	11.4	11.5	11.6	11.6	10.1	9.5	9.0	8.3	7.7	9.9
Helena, Mont.	6.4	6.7	7.3	7.3	6.2	6.3	7.1	7.4	6.7	6.7	6.1	6.5	6.6	6.9	7.3	8.3	9.2	9.7	10.2	9.5	9.0	9.2	12.1	12.1	12.0
Huron, S. Dak.	11.6	11.9	12.2	11.3	10.8	10.9	10.8	10.7	12.1	13.8	15.4	15.9	15.5	16.8	17.6	18.4	18.2	17.7	16.6	14.2	12.1	10.8	12.7	11.8	13.8
Independence, Cal.	10.0	11.5	11.0	10.1	10.0	9.2	9.0	9.2	9.5	9.6	11.8	14.4	14.0	13.2	13.9	14.0	15.7	15.9	15.9	14.5	13.8	12.3	11.5	10.9	12.1
Indianapolis, Ind.	9.7	9.1	8.5	8.5	8.9	8.9	8.8	9.3	10.3	11.2	11.8	12.3	12.5	12.8	12.3	12.4	12.4	11.8	11.0	9.2	9.5	10.2	10.1	9.8	10.5
Jacksonville, Fla.	6.8	7.3	7.3	6.4	6.6	6.8	6.1	7.1	9.7	9.0	9.0	9.1	9.0	10.1	10.4	10.8	10.5	9.9	8.4	7.2	7.7	6.7	9.5	6.4	8.1
Jupiter, Fla.	9.6	10.2	10.0	10.3	9.8	9.9	9.6	10.0	11.3	12.9	13.5	13.8	14.2	14.1	14.0	14.4	14.5	13.2	12.0	10.8	10.4	10.3	9.5	9.4	11.4
Kalispell, Mont.	5.0	5.8	5.7	5.5	5.5	5.3	5.3	5.5	5.7	5.8	5.1	4.4	5.1	5.6	6.0	7.0	7.6	7.6	7.8	7.5	6.6	6.5	5.3	4.0	4.6
Kansas City, Mo.	7.0	7.2	7.4	6.9	6.2	6.5	6.6	7.0	7.5	8.2	8.9	9.3	9.9	9.7	10.6	10.4	10.2	9.6	9.2	8.3	7.6	6.8	7.2	6.9	6.7
Keokuk, Iowa.	7.6	7.7	7.1	7.3	7.4	7.2	7.0	7.8	8.0	8.5	8.6	8.8	9.4	9.7	11.0	10.4	10.8	9.4	9.4	8.9	7.6	6.9	6.5	6.9	7.1
Key West, Fla.	9.2	9.1	9.1	8.6	8.3	8.3	9.0	9.4	10.3	10.2	11.2	11.6	11.4	11.3	11.0	10.6	10.4	10.2	9.8	10.3	9.5	9.4	9.0	8.9	8.5
Kittyhawk, N. C.	10.4	12.6	14.2	14.0	13.5	12.2	12.5	13.4	14.4	14.7	14.8	14.4	14.1	15.2	15.2	15.5	13.8	13.3	12.6	12.2	9.5	9.4	9.8	10.3	10.1
Knoxville, Tenn.	5.8	5.7	5.6	6.1	6.1	5.8	6.1	6.3	6.6	7.0	8.1	8.2	8.3	9.1	9.3	10.2	9.7	9.6	8.1	8.0	6.9	6.7	6.3	5.4	7.3
La Crosse, Wis.	6.4	5.5	5.5	5.9	5.6	5.6	5.5	5.8	6.2	6.6	7.0	7.4	8.0	8.5	9.1	9.7	9.4	8.7	7.9	6.9	6.1	5.9	6.1	6.2	6.9
Lander, Wyo.	3.2	3.5	2.8	2.8	2.8	2.5	2.4	2.1	2.3	2.1	2.9	3.4	4.0	4.8	5.9	7.0	6.6	6.9	6.5	6.1	5.3	4.7	4.5	3.5	4.1
Lexington, Ky.	10.8	11.2	10.9	10.8	10.3	10.4	10.5	10.7	10.7	11.7	13.2	12.4	12.8	12.9	12.7	13.4	13.3	12.2	10.7	10.5	9.9	10.7	10.5	10.2	11.3
Little Rock, Ark.	7.0	7.0	6.4	6.8	6.6	6.4	6.2	5.6	6.1	7.7	8.5	9.5	9.4	10.1	11.0	10.7	10.7	9.5	8.9	7.5	6.7	6.7	6.6	6.3	7.8
Los Angeles, Cal.	3.2	3.0	3.0	2.6	2.4	2.5	2.8	2.7	2.3	2.7	3.8	3.8	4.5	5.3	6.8	8.6	9.5	10.3	10.0	8.8	7.7	5.8	4.1	3.3	5.0
Louisville, Ky.	7.6	7.8	7.5	7.4	7.2	7.2	7.1	7.3	8.2	9.2	10.2	11.4	11.4	11.9	11.9	11.8	11.9	10.0	8.4	8.5	8.5	8.2	8.0	9.2
Lynchburg, Va.	3.9	3.1	3.4	3.6	3.3	3.3	3.2	2.7	5.6	6.1	5.8	6.3	7.0	7.0	6.7	7.1	6.8	6.5	5.4	4.5	4.3	3.6	3.6	3.7	4.9
Macon, Ga.	5.2	5.0	4.9	4.9	4.2	3.9	4.5	5.6	6.7	7.7	8.5	8.3	8.5	9.2	9.4	9.0	8.9	8.4	7.1	6.2	5.9	5.7	5.5	5.6	6.5
Marquette, Mich.	7.6	7.6	6.9	6.3	6.3	6.6	6.1	6.4	7.8	8.0	8.7	8.5	8.7	8.5	9.3	9.8	8.3	8.3	7.4	6.5	6.7	6.4	7.2	7.3	7.3
Memphis, Tenn.	10.8	10.7	9.9	10.5	10.0	9.1	9.7	9.0	9.3	10.3	10.9	11.5	10.5	10.6	9.7	8.8	8.3	10.0	9.8	10.2	9.3	9.0	8.5	9.3	10.4
Milwaukee, Wis.	10.4	10.6	10.5	9.7	9.7	9.8	10.1	10.0	10.3	11.2	12.4	12.9	12.9	13.1	13.0	13.2	12.5	12.5	12.1	10.9	10.4	9.7	10.7	10.5	11.1
Mobile, Ala.	6.6	6.3	5.7	6.1	6.1	6.2	6.1	5.9	5.9	7.2	8.3	8.1	11.2	11.9	12.9	12.5	12.5	12.1	12.6	11.2	10.3	9.3	8.4	8.1	7.2
Montgomery, Ala.	5.6	5.6	5.4	5.4	5.4	5.0	4.9	5.4	5.8	7.2	7.7	8.1	8.5	8.5	8.7	8.3	7.7	7.0	6.4	6.1	4.9	4.3	4.0	3.8	5.8
Moorhead, Minn.	10.0	10.1	10.2	10.0	9.5	9.9	10.5	10.7	10.9	11.8	13.5	13.6	13.8	14.6	14.8	15.1	15.3	14.3	13.8	12.6	11.9	11.6	12.6	11.9	12.6
Mount Tamalpais, Cal	29.5	28.7	28.5	26.1	26.4	27.4	27.3	25.9	26.3	25.2	22.8	20.7	16.4	15.1	15.3	16.2	17.9	19.6	21.4	23.8	26.7	28.5	28.8	29.2	23.9
Nantucket, Mass.	10.3	10.7	11.1	10.7	10.2	10.1	10.6	12.2	12.4	12.3	12.4	12.7	13.1	12.8	12.0	12.0	11.1	10.6	9.9	9.7	10.2	10.5	10.4	10.4	11.2
Nashville, Tenn.	5.3	5.7	5.2	4.4	4.8	4.2	4.7	5.5	6.8	7.1	7.6	8.8	8.8	8.6	9.1	9.7	9.5	9.3	8.5	7.6	6.9	6.4	6.2	6.5	7.0
Neah Bay, Wash.	5.6	5.2	5.3	5.0	4.6	5.1	5.7	5.7	4.8	5.6	6.6	6.9	8.8	8.6	8.5	9.0	8.5	8.9	8.5	7.6	6.7	6.6	6.9	6.3	7.6
New Haven, Conn.	6.9	6.9	7.1	6.6	6.5	6.6	7.3	8.8	10.2	11.5	11.7	11.3	11.7	12.0	11.7	11.9	12.0	11.9	10.8	10.9	11.9	11.3	9.6	7.7	9.5
New Orleans, La.	7.7	7.4	7.3	7.9	7.6	7.4	6.4	6.2	7.4	8.4	9.0	10.9	10.9	10.9	10.3	11.9	11.9	11.9	13.5	12.7	10.3	8.4	7.6	9.2	8.9

TABLE V.—*Average wind movement, etc.*—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
New York, N. Y.	12.7	12.7	12.4	11.5	11.4	11.9	11.7	12.7	13.2	14.2	15.3	15.9	17.3	19.0	19.9	21.8	22.0	21.7	20.4	18.0	16.8	16.2	15.6	13.3	15.7
Norfolk, Va.	8.7	8.6	8.4	8.2	8.4	7.8	8.5	9.1	9.8	10.9	11.2	11.1	11.1	11.0	10.6	11.2	11.0	9.8	8.5	8.1	8.1	8.7	8 8	8.2	9.4
Northfield, Vt.	6.5	6.4	6.9	6.9	7.2	6.2	6.2	8.2	9.8	12 0	14.3	14.5	15.3	14.4	15.1	14 4	13.5	10.8	8.7	6.9	6.7	6.4	6.5	6.5	9.6
North Platte, Nebr.	11.1	10.6	10.3	9.0	9.1	8.8	8.2	8.6	9 4	10.9	11.9	13.2	14.9	15.0	14.6	14.6	14.7	14.1	14.5	14.2	12.6	11.1	10.4	10.8	11.8
Oklahoma, Okla.	9.7	9.0	8.8	8.7	9.3	8.9	9.0	9.5	10.5	12.7	13.7	13.7	14.5	14.9	15.5	15.3	15.3	13.2	13.3	11.3	9.3	8.8	9.4	9.5	11.5
Omaha, Nebr.	8.1	7.6	7.6	7.5	7.2	7.3	6.8	7.6	7.7	8.5	9.6	10.8	11.7	11.5	11.7	12.1	11.4	11.0	10.9	9.4	9.0	8.7	8.9	8.2	9.2
Oswego, N. Y.	9.5	9.1	9.7	9.8	10.0	9.9	10.4	10.8	11.5	11.3	11.9	12.2	12 3	12.0	11.8	11 4	10.4	9.8	7.7	7.3	7.6	8.7	9.6	8.9	10.1
Palestine, Tex.	7.1	7.1	6.4	6.9	6.7	6.7	6.8	6.2	7.1	8.8	9.4	9.4	10.0	10.6	9.9	10.2	9.3	9.8	9.1	8.1	6.8	7.1	7.2	7.0	8.1
Parkersburg, W. Va.	4.8	4.2	4.3	3.9	4.6	4.0	3.7	4.1	5.6	6.8	7.8	8.1	9 8	9.9	10.0	9.9	9.7	9.8	8.7	6.7	5.4	5.0	4.7	4.6	6.5
Pensacola, Fla.	8.2	8.2	8.5	8.2	8.1	8.0	8.1	9.3	9.4	9.6	10.4	10.1	11.4	12.0	11.9	12.0	11.1	11.7	13.1	10.5	8.8	8.1	8 3	8.2	9.7
Phenix, Ariz.	3.5	3.5	3.7	4.0	3.9	3.8	3.9	4.2	4.6	4.8	5.0	5.8	5.7	5.8	6.3	7.0	7.5	7.1	6.8	5.9	4.8	4.3	4.2	4.0	5.0
Philadelphia, Pa.	9.7	9.7	8.9	8.3	8.8	8.6	8.8	10.4	11.1	12.0	12 1	12.4	13.7	13.5	14 0	14.1	14.5	14.4	12.7	11.6	11.4	11.0	10.6	10.3	11.4
Pierre, S. Dak.	12.8	11.6	11.5	11.1	11.3	11.3	11.6	11.4	12 2	12.8	14 1	16.1	17.8	18.2	18.6	17.6	18.1	17.6	17.2	15.4	13.3	12.7	12.7	12.1	14.1
Pittsburg, Pa.	5.1	5.3	4.7	5.0	5.2	5.2	5.9	6.0	6.7	7.3	8.3	9.2	9.4	9.6	9.9	9.8	9.7	8.9	7.3	6.1	5.8	5.9	5.7	5.2	7.0
Pocatello, Idaho	7.6	8.1	8.3	8.5	8.9	8.6	8.4	8.3	7.9	7.8	8.7	9.4	10.6	10.9	10.2	9.8	9.8	8.9	9.9	9.3	8.0	7.0	7.4	7.9	8.8
Point Reyes Lt., Cal.	22.9	22.8	22.0	21.9	22.0	21.3	20.8	20.3	19.7	18.8	18.9	19.5	20.7	21.7	22.1	22.7	24 2	24.6	25.7	26.0	26.5	27.0	26.6	23.8	22.6
Port Crescent, Wash.	3.7	3.6	3.6	3.2	3.4	3.3	3.1	3.3	3.4	3.1	3.8	5.0	6.3	6.8	7.1	7.5	7.9	8.0	6.8	7.3	6.3	5.6	5.4	4.5	5.1
Port Huron, Mich.	9.8	9.8	9.8	9.8	9.8	10.1	10.1	10.1	11.1	11.8	12 5	12.9	13.3	13.4	13.4	14.0	13.0	11.7	10.3	9.1	9.5	10.1	9.3	9.3	11.0
Portland, Me.	6.0	5.9	5.8	5.7	5.8	6.2	6.9	8.7	9.5	10.1	10.3	10.8	11.0	11.4	11.4	11.4	11.3	9.7	8.6	7.4	7.2	6.9	6.6	6.2	8.4
Portland, Oreg.	7.3	7.9	7.5	6.3	6.1	5.8	6.4	6.2	6.7	7.6	7.3	8.5	8.4	8.7	8.6	9.3	9.5	10.0	10.5	10.2	10.6	10.0	8.3	7.9	8.1
Pueblo, Colo.	7.9	7.8	7.1	7.0	6.0	5.5	5.4	5.2	5.7	7.1	7.6	8.2	9.1	9.8	10.8	11.0	11.7	12.1	10.8	9.7	9.1	9.3	7.7	8.4	
Raleigh, N. C.	5.2	4.9	4.4	4.4	4.1	4.6	4.6	5.6	6.5	7.0	7.1	7.4	7.8	7.9	7.4	7.4	7.4	6.6	5.5	5 2	5.2	5.4	5.4	5.2	5.9
Rapid City, S. Dak.	7.2	6.6	6.8	6.6	6.3	4.6	4.6	5.6	6.0	7.0	8.9	10.0	11.1	11.2	10.9	10.7	10.1	10 1	8.6	7.7	6.4	6.7	7.1	7.8	8.1
Red Bluff, Cal.	6.7	5 9	6.1	6.1	6.4	6.6	6.3	5.9	6.0	6.9	6.9	8.5	7.8	8.4	9.6	8.9	8.9	8.9	9.1	9.3	8.4	7.1	6.4	6.3	7.5
Richmond, Va.	6.1	5.7	5.9	6.1	6.1	6.3	6.8	5.9	6.1	6 1	6.0	7.6	8.1	8.5	8.4	8.3	7.5	7.1	6.9	9.4	7.5	5.4	5.3	5.7	6.8
Rochester, N. Y.	5.9	5.7	5.7	5.6	5.8	5.9	6.6	7.6	8.2	8.7	9.7	9.9	10 6	10 6	11.0	10.8	10.7	12.1	10.8	9.7	9.1	9.8	9.1	7.7	8.4
Roseburg, Oreg.	2.6	2.3	2.7	2.6	2.4	2.6	2.1	2.0	1.7	2.1	2.4	3.7	4.1	5.0	6.0	6.0	6.6	10 1	8.5	5 2	5.2	5.4	5.4	5.2	5.9
Sacramento, Cal.	8.3	8.7	9.2	9.2	9.4	9.9	10.1	9.6	9.4	9.9	10.6	11.5	11.8	12.0	12.3	12.3	11.9	8.9	9.1	7.7	6.4	6.7	7.1	7.8	8.1
St. Louis, Mo.	8.9	9.4	9.6	10 0	10.1	10.1	10.2	10.7	10.7	10.8	10.8	11.4	11.1	12.0	11.6	12.5	11.8	8.9	7.1	9.8	8.4	7.1	6.4	6.3	7.5
St. Paul, Minn.	5.9	5.9	5.7	6.4	6.0	6.0	5.8	6.2	7.8	8.4	9.7	10.3	10.8	11.2	11.5	11.7	10.7	7.1	6.9	6.4	8.4	6.3	5.3	5.7	6.8
Salt Lake City, Utah.	5.1	5.2	5.1	5.5	5.2	5.0	4.6	5.4	5.0	4.5	5.5	7.0	9.2	10.4	11.7	12.4	11.5	9.7	7.0	8.4	7.0	7.4	6.4	6.0	7.9
San Antonio, Tex.	9.3	8.3	7.4	7.9	8.2	8.6	7.7	7.3	8.9	9.9	10.6	11.8	11.5	10.8	12.3	11.9	11.8	11.2	10.9	7.0	7.1	7.0	4.6	3.1	4.1
San Diego, Cal.	5.4	5.4	5.2	5.3	6.1	5.7	5.5	4.8	5 0	5.5	9.0	10.1	11.8	11.6	12.2	11.9	11.8	11.6	11.4	10.9	10.1	10.1	9.0	8.3	10.4
Sandusky, Ohio	6.7	6.6	6.8	7.1	6.9	6 6	7.1	7.5	8.7	9.0	9.5	11.4	11.1	11.6	12.5	11.5	11.5	11.6	9.6	8.1	7.3	6.8	9.7	9.8	10.6
San Francisco, Cal.	10.6	9.0	8.1	8.2	8.3	8.0	7.5	7.8	7.8	9.4	9.4	9.7	10.3	11.2	11.5	11.7	10.7	11.8	11.6	11.3	9.5	7.3	6.3	6.2	8.0
San Luis Obispo, Cal.	2.4	2.4	2.4	2.5	2.5	3.0	2.8	2.9	2.9	2.9	3.4	4.5	5 5	6.7	8 6	10.7	11.5	10.4	10.3	8.9	8.1	7.0	5.8	5.8	7.3
Santa Fe, N. Mex.	6.7	5.8	5.8	5.5	5.7	5.1	4.4	4.1	5.1	6.4	7.5	8.5	10.2	10.7	11.6	11.4	11.6	11.1	7.5	9.3	9.2	10.2	10.6	10.4	9.5
Sault Ste. Marie, Mich.	6.4	6.3	6.2	6.3	6.2	6.6	6.0	5.9	6.8	7.2	8.6	9.0	9.8	9.7	10.7	11.0	12.0	11.1	10.3	6.5	9.5	8.1	6.9	5.6	7.5
Savannah, Ga.	7.8	7.2	7.2	7.1	6.7	7.4	7.3	7.9	8.7	8.6	8.4	9.6	9.6	10.7	11.0	10.5	11.9	11.6	11.3	8.4	6.5	6.6	6.4	6.0	7.7
Seattle, Wash.	4.1	4.2	4.1	4.1	4.0	4.1	4.0	3.9	4.2	4.3	4.8	5.5	5.6	10.8	11.7	11.9	9.9	8.5	7.6	7.0	5.9	13.4	11.1	11.8	
Shreveport, La.	6.4	6.0	5.9	6.0	5.6	5.5	5.0	4.7	5.6	6.8	8.1	8.7	9.2	9.5	9.5	9.5	9.7	9.1	8.6	7.1	6.5	7.3	7.3	6.7	7.3
Sioux City, Iowa.	13.1	12.6	11.5	11.1	11.3	12.4	12.8	12.4	13.0	13.7	14.3	15.6	16.7	16.8	17.3	18.0	17.3	16.8	15.4	14.8	14.7	14.4	13.6	13.6	14.4
Spokane, Wash.	4.8	4.8	4.5	4.1	4.6	5.1	5 2	5.6	5.6	5.8	6 1	6.2	6.8	7.1	7.6	7.5	7.7	7.5	7.7	7.5	6.6	5.8	5.3	5.3	6.1
Springfield, Ill.	9.2	9.9	10.0	9.9	9.5	10.0	9.7	10.4	10.9	11.9	11.9	11.5	11.3	11.3	11.3	11.1	10.9	10.2	9.4	9 2	9.2	9.2	9.2	9.2	10.4
Springfield, Mo.	10.2	10.3	10.1	11.2	10.9	10.6	11.2	10.6	11.6	12.2	12.3	12.3	12.8	12.9	13.0	12.1	11.3	10.2	9.6	8.9	9.8	9.5	10.2		11.1
Tacoma, Wash.																									
Tampa, Fla.																									
Toledo, Ohio.	5.0	4.7	4.8	4.9	4.9	5.0	5.0	6.6	7.9	8.4	8.4	8.0	7.9	8.1	8.5	9.0	9.8	8.9	7.6	6.4	5.3	4.8	5.2	5.3	6.7
Valentine, Nebr.	8.5	8.8	8.8	8.6	8.6	9.0	8.9	9.9	10.6	11.1	12.4	12.8	13.6	13.6	13.5	13.4	13 1	11.9	10.2	9.7	8.8	8.6	10.9	10.5	10.5
Vicksburg, Miss.	10.6	10.0	10.1	9.3	9.7	10.1	9.8	9.9	11.2	12.5	15.0	16.3	16.4	16.0	16.6	16.9	16.1	15.5	15.3	13.4	10.6	10.6	10.6	10.5	12.7
Vineyard Haven, Mass.	8.3	8.1	7.5	7.2	7.2	6.7	6.7	6.7	7.1	7.6	8.0	8.3	9.0	9.0	9.0	9.6	8.8	8.2	8.4	7.3	7.3	8.1	8.1	8.1	7.9
Walla Walla, Wash.	5.9	6.1	6.2	5.8	6.0	6.1	6.5	7.2	7.9	8.0	8.4	8.9	9.0	9.3	9.9	9.6	9.2	8.4	7.2	6.5	6.6	6.6	6.3	5.8	7.4
Washington, D. C.	5.6	5.3	5.1	5.4	5.4	6.0	5.5	5.2	5.1	5.4	6.1	6.5	6.9	7.1	7.1	6.2	6.7	7.3	7.1	6.5	6.3	6.3	6.0	5.5	6.0
Wichita, Kans.	6.0	5.5	5.5	5.3	5.5	5.5	5.5	6.6	8.2	8.9	10.4	10.7	11.3	11.6	11.4	10.4	10.0	8.5	6.6	6.3	6.3	6.3	6.3	5.8	7.7
Williston, N. Dak.	7.5	7.6	8.2	7.8	7.5	7.5	7.6	8.1	8.8	10.6	11.6	12.1	13.3	12.6	12.5	12.4	12.4	12.1	11.0	9.2	8.3	7.9	7.5	7.6	9.6
	7.3	6.9	6.9	6.3	6 4	6.2	6.6	6.6	7.2	8.1	9.6	10.2	12.0	11.6	11.5	12.2	13.1	12.0	11.6	11.0	9.5	8.3	8.5	8.2	9.1
Wilmington, N. C.	6.5	6.4	6.3	5.6	6.3	6.5	6.6	7.5	8.7	9.6	9.2	10.6	11.6	13.0	13.5	13.2	13.1	11.9	10.0	9.0	8.4	7.8	7.3	6.8	9.0
Winnemucca, Nev.	9.1	10.1	9.5	5.8	9.8	8.9	9.0	8.8	7.9	8.9	9.7	10.7	11.2	11.4	12.3	12.9	13.5	12.7	12.1	12.0	10.2	9.6	8.7	10.5	
Woods Hole, Mass.	13.0	13.4	13.0	12.3	12.8	13.0	13.1	13.6	13.4	12.8	12.8	12.8	13.9	14.4	15.1	14.0	13.1	12.7	13.2	13.1	13.5	12.6	12.5	13.2	
Yankton, S. Dak.	9.7	9.5	8.2	7.8	7.7	8.5	8.6	8.6	9.1	10.5	12.0	13.5	15.0	15.0	14.3	14.0	13.8	13.4	11.4	10.3	10.1	10.7	9.8	11.1	
West Indies.																									
Basseterre, St. Kitts.	10.3	10.3	10.3	10.1	9.8	9.9	10.4	12.3	12.9	13.1	13.1	12.5	12.3	12.1	11.9	11.5	11.1	10.3	10.3	10.7	11.2	11.1	10.9	10.3	11.2
Bridgetown, Bar.	6.9	6.8	6.5	6.7	7.0	7.3	10.7	13.0	14.3	14.9	15.1	14.4	14.6	13.9	13.4	12.4	11.5	9.0	7.7	7.6	7.2	7.2	6.9	6.7	10.1
Cienfuegos, Cuba *	4.7	5.0	5.0	5.1	5.0	4.7	4.4	4.7	5.0	5.8	6.7	8.7	10.0	11.8	12.4	12.0	10.5	9.6	8.0	6.6	6.1	5.6	5.2	5.4	7.0
Havana, Cuba.																									
Kingston, Jamaica.	4.4	4.3	4.7	4.8	4.8	4.9	4.3	3.5	3.3	5.6	8.1	11.0	13.0	13.0	11.5	10.2	8.6	6.8	4.4	3.3	3.7	3.5	4.1	4.1	6.2
Port of Spain, Trin.	2.7	2.5	2.0	2.0	2.1	1.9	3.0	5.3	7.7	8.5	9.1	8.6	8.9	8.7	8.9	7.8	7.0	6.0	4.2	3.3	3.0	2.9	2.4	2.6	5.0
Puerto Principe, Cuba	4.9	4.5	4.1	4.0	3.8	3.7	4.3	8.3	10.6	9.6	8.6	8.4	8.7	8.9	9.7	10.7	11.4	10.4	8.6	7.1	6.0	5.5	5.2	5.2	7.2
Roseau, Dominica.	5.9	5.4	4.8	4.7	4.9	4.8	5.3	5.8	7.3	7.6	8.0	8.5	8.6	8.6	8.1	8.3	7.0	5.9	5.9	5.5	5.5	5.5	6.2	6.4	
San Juan, Puerto Rico	9.9	8.5	8.3	8.2	8.4	8.3	8.2	10.2	13.6	15.6	16.9	17.6	18.9	19.2	18.4	17.0	15.6	14.5	12.9	12.5	12.0	11.4	10.8	10.6	12.8
Santiago de Cuba.	2.8	2.6	2.6	2.5	2.5	2.3	2.2	3.2	4.1	4.9	5.4	6.1	7.4	7.4	7.1	6.9	6.2	4.8	3.4	2.7	3.0	3.2	8.0	2.7	4.1
Santo Domingo, S. D.	4.2	4.4	4.7	4.7	4.8	4.8	5.1	5.7	6.1	6.8	8.0	9.3	8.7	9.9	9.6	9.2	8.5	6.9	6.4	6.4	5.7	5.2	4.8	4.4	6.4
Willemstad, Curaçao.	11.2	10.8	10.6	10.8	10.7	10.8	12.2	14.4	15.3	15.6	15.6	15.4	15.6	15.9	16.3	15.8	15.3	14.4	13.6	12.8	12.5	11.9	11.8	11.5	13.4

* For 23 days.

TABLE VI.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of April*, 1900.

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me.	20	10	12	22	n. 32 w.	19
Portland, Me.	26	12	8	29	n. 56 w.	25
Northfield, Vt.	28	25	3	13	n. 73 w.	10
Boston, Mass.	28	9	5	31	n. 54 w.	32
Nantucket, Mass.	24	17	7	30	n. 73 w.	24
Woods Hole, Mass.	25	13	8	24	n. 53 w.	20
Block Island, R. I.	19	18	8	30	n. 87 w.	22
New Haven, Conn	31	12	8	18	n. 28 w.	22
Middle Atlantic States.						
Albany, N. Y.	26	14	8	21	n. 47 w.	18
Binghamton, N. Y.†	17	4	2	14	n. 43 w.	18
New York, N. Y.	23	13	13	30	n. 60 w.	20
Harrisburg, Pa.†	12	3	5	16	n. 51 w.	14
Philadelphia, Pa	26	14	11	23	n. 45 w.	17
Atlantic City, N. J.	25	18	10	21	n. 58 w.	13
Cape May, N. J.	22	19	11	24	n. 77 w.	13
Baltimore, Md.	22	14	13	24	n. 54 w.	14
Washington, D. C.	30	12	12	20	n. 24 w.	20
Lynchburg, Va.	21	16	20	20	n.	5
Norfolk, Va.	22	19	24	10	n. 78 e.	14
Richmond, Va.	28	18	18	13	n. 45 e.	7
South Atlantic States.						
Charlotte, N. C.	26	17	22	12	n. 48 e.	14
Hatteras, N. C.	22	19	21	14	n. 67 e.	8
Kittyhawk, N. C.						
Raleigh, N. C.	25	13	17	29	n. 27 w.	13
Wilmington, N. C.	15	21	17	21	s. 34 w.	7
Charleston, S. C.	15	23	14	21	s. 41 w.	11
Augusta, Ga.	16	22	16	18	s. 18 w.	6
Savannah, Ga.	11	25	10	23	s. 43 w.	19
Jacksonville, Fla.	10	21	20	21	s. 5 w.	11
Florida Peninsula.						
Jupiter, Fla.	12	25	29	11	s. 54 e.	22
Key West, Fla.	16	19	41	1	s. 86 e.	41
Tampa, Fla.	17	18	20	21	s. 45 w.	1
Eastern Gulf States.						
Atlanta, Ga.	16	18	18	22	s. 63 w.	4
Macon, Ga†	11	9	8	9	n. 27 w.	2
Pensacola, Fla.†	9	13	11	3	s. 63 e.	9
Mobile, Ala.	13	32	15	12	s. 9 e.	19
Montgomery, Ala.	14	23	16	20	s. 13 w.	18
Meridian, Miss.†	7	12	7	9	s. 22 w.	5
Vicksburg, Miss.	14	25	27	9	s. 59 e.	21
New Orleans, La.	10	31	28	11	s. 39 e.	27
Western Gulf States.						
Shreveport, La.	9	26	22	12	s. 30 e.	20
Fort Smith, Ark.	11	12	33	13	s. 87 e.	20
Little Rock, Ark.	20	17	25	15	n. 73 e.	10
Corpus Christi, Tex.	13	22	37	3	s. 75 e.	35
Fort Worth, Tex†	7	13	10	9	s. 9 e.	6
Galveston, Tex.	6	24	35	6	s. 58 e.	34
Palestine, Tex.	11	30	20	10	s. 28 e.	22
San Antonio, Tex.	20	24	26	3	s. 81 e.	25
Ohio Valley and Tennessee.						
Chattanooga, Tenn.	17	18	12	24	s. 85 w.	12
Knoxville, Tenn.	30	12	18	14	n. 18 e.	18
Memphis, Tenn.	18	18	25	15	e.	10
Nashville, Tenn.	19	20	19	15	s. 76 e.	4
Lexington, Ky†	7	8	14	7	s. 82 e.	7
Louisville, Ky.	25	14	18	16	n. 10 e.	11
Evansville, Ind.†	10	6	15	4	n. 70 e.	12
Indianapolis, Ind.	24	14	20	17	n. 17 e.	10
Cincinnati, Ohio	23	15	23	14	n. 48 e.	12
Columbus, Ohio	26	10	22	22	n.	16
Pittsburg, Pa.	28	12	9	20	n. 34 w.	19
Parkersburg, W. Va.	29	16	9	17	n. 32 w.	15
Elkins, W. Va.	31	14	5	22	n. 45 w.	24
Lower Lake Region.						
Buffalo, N. Y.	13	24	8	27	s. 60 w.	22
Oswego, N. Y.	15	17	12	25	s. 81 w.	13
Rochester, N. Y.	21	10	9	34	n. 66 w.	27
Erie, Pa.	16	14	13	29	n. 84 w.	16
Cleveland, Ohio	19	20	14	23	s. 84 w.	9
Sandusky, Ohio	14	15	23	24	s. 45 w.	1
Toledo, Ohio	19	13	19	23	n. 34 w.	7
Detroit, Mich.	20	12	20	21	n. 7 w.	8
Upper Lake Region.						
Alpena, Mich.	18	18	22	17	e.	5
Escanaba, Mich.	31	18	13	13	n.	18
Grand Haven, Mich.	16	15	21	18	n. 72 e.	8
Marquette, Mich.	33	6	9	25	n. 31 w.	31
Port Huron, Mich.	26	14	13	12	n. 5 e.	12
Sault Ste. Marie, Mich.	12	14	19	26	s. 74 w.	7
Chicago, Ill.	18	17	27	16	n. 85 e.	11
Milwaukee, Wis.	24	12	23	21	n. 9 e.	12
Green Bay, Wis.	33	15	5	9	n. 13 w.	18
Duluth, Minn.	32	10	27	13	n. 32 e.	26
North Dakota.						
Moorhead, Minn.	18	24	26	9	s. 71 e.	18
Bismarck, N. Dak.	19	21	18	9	s. 77 e.	9
Williston, N. Dak.	17	24	25	8	s. 68 e.	18

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Mississippi Valley.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
St. Paul, Minn.	17	19	24	14	s. 79 e.	10
La Crosse, Wis.†	12	12	9	3	e.	6
Davenport, Iowa	15	13	29	16	n. 81 e.	13
Des Moines, Iowa	14	23	30	12	s. 63 e.	20
Dubuque, Iowa	16	17	22	18	s. 76 e.	4
Keokuk, Iowa	12	13	31	15	s. 87 e.	16
Cairo, Ill.	20	19	26	11	n. 86 e.	15
Springfield, Ill.	11	18	27	16	s. 58 e.	13
Hannibal, Mo†	8	9	15	6	s. 84 e.	9
St. Louis, Mo.	14	13	30	12	n. 87 e.	18
Missouri Valley.						
Columbia, Mo.*	6	6	16	8	e.	8
Kansas City, Mo.	20	15	27	15	n. 67 e.	13
Springfield, Mo.	14	24	26	13	s. 52 e.	16
Lincoln, Nebr.	16	23	26	7	s. 70 e.	20
Omaha, Nebr.	15	25	33	13	s. 63 e.	22
Valentine, Nebr.	13	24	28	11	s. 47 e.	16
Sioux City, Iowa†	8	7	16	6	n. 84 e.	10
Pierre, S. Dak.	13	20	33	4	s. 76 e.	30
Huron, S. Dak.	14	18	30	10	s. 79 e.	20
Yankton, S. Dak†	7	5	13	7	n. 72 e.	6
Northern Slope.						
Havre, Mont.	26	8	21	19	n. 6 e.	18
Miles City, Mont.	16	22	27	8	s. 72 e.	20
Helena, Mont.	15	18	9	32	s. 83 w.	23
Kalispell, Mont.	18	15	12	28	n. 79 w.	16
Rapid City, S. Dak.	14	21	16	20	s. 30 w.	8
Cheyenne, Wyo.	25	18	14	16	n. 16 w.	7
Lander, Wyo.	16	22	14	25	s. 61 w.	12
North Platte, Nebr.	12	24	24	12	s. 45 e.	17
Middle Slope.						
Denver, Colo.	21	25	8	14	s. 56 w.	7
Pueblo, Colo.	24	12	13	25	n. 45 w.	17
Concordia, Kans.	11	27	22	11	s. 34 e.	19
Dodge, Kans.	16	23	26	14	s. 60 w.	14
Wichita, Kans.	15	30	21	6	s. 45 e.	21
Oklahoma, Okla.	9	25	15	10	s. 14 e.	21
Southern Slope.						
Abilene, Tex.	13	29	28	10	s. 48 e.	24
Amarillo, Tex.	15	27	16	17	s. 5 w.	12
Southern Plateau.						
El Paso, Tex.	18	6	13	38	n. 64 w.	28
Santa Fe, N. Mex.	18	25	16	18	s. 16 w.	7
Flagstaff, Ariz.	16	18	5	36	s. 87 w.	31
Phenix, Ariz.	9	13	20	29	s. 66 w.	10
Yuma, Ariz.	13	12	10	28	n. 87 w.	18
Independence, Cal.	27	14	10	26	n. 51 w.	20
Middle Plateau.						
Carson City, Nev.	22	17	9	24	n. 72 w.	16
Winnemucca, Nev.	26	14	14	17	n. 14 w.	12
Cedar City, Utah.	13	29	18	11	s. 24 e.	18
Salt Lake City, Utah.	29	16	12	18	n. 25 w.	14
Grand Junction, Colo.	21	18	16	21	n. 59 w.	6
Northern Plateau.						
Baker City, Oreg.	24	26	14	13	s. 27 e.	2
Boise, Idaho	22	15	15	27	n. 60 w.	14
Pocatello, Idaho	11	20	7	28	s. 67 w.	23
Spokane, Wash.	6	30	18	17	s. 2 e.	24
Walla Walla, Wash.	10	37	9	13	s. 8 w.	27
North Pacific Coast Region.						
Astoria, Oreg.	16	14	14	26	n. 81 w.	12
Neah Bay, Wash.	6	13	14	34	s. 71 w.	21
Port Crescent, Wash*	1	3	9	20	s. 80 w.	11
Seattle, Wash.	22	15	18	16	n. 16 e.	7
Tacoma, Wash.	21	22	9	16	s. 82 w.	7
Portland, Oreg.	18	21	13	24	s. 75 w.	11
Roseburg, Oreg.	27	11	18	21	n. 9 w.	18
Middle Pacific Coast Region.						
Eureka, Cal.	26	16	14	22	n. 39 w.	13
Mount Tamalpais, Cal.	27	10	5	36	n. 61 w.	35
Red Bluff, Cal.	27	18	14	13	n. 6 e.	9
Sacramento, Cal.	18	28	15	19	s. 22 w.	11
San Francisco, Cal.	6	15	4	44	s. 77 w.	41
South Pacific Coast Region.						
Fresno, Cal.	33	7	11	26	n. 30 w.	30
Los Angeles, Cal.	13	13	14	31	w.	17
San Diego, Cal.	24	9	12	32	n. 53 w.	25
San Luis Obispo, Cal.	13	9	5	23	n. 82 w.	28
West Indies.						
Basseterre, St. Kitts Island	14	8	42	3	n. 81 e.	40
Bridgetown, Barbados	9	7	58	0	n. 88 e.	58
Cienfuegos, Cuba‡	25	13	24	2	n. 61 e.	23
Havana, Cuba	12	7	47	0	n. 84 e.	47
Kingston, Jamaica	30	8	22	4	n. 39 e.	28
Port of Spain, Trinidad	8	6	50	2	n. 88 e.	48
Puerto Principe, Cuba	25	3	46	2	n. 63 e.	49
Roseau, Dominica, W. I.	16	13	34	9	n. 83 e.	25
San Juan, Puerto Rico.	7	17	40	4	s. 74 e.	37
Santiago de Cuba, Cuba.	23	27	21	6	s. 75 e.	14
Santo Domingo, S. Domingo, W. I.	42	9	16	2	n. 23 e.	36
Willemstad, Curaçao.	7	3	55	0	n. 86 e.	55

*From observations at 8 p. m. only. †From observations at 8 a. m. only. ‡Record for 23 days.

TABLE VII.—*Thunderstorms and auroras, April, 1900.*

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	52	T.	....	....	1	2	....	....	....	8	2	8	8	....	....	....	2	2	3	1	....	2	4	3	2	....	2	6	1	1	6	1	....	65	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arizona	56	T.	2	....	2	....	1	1	....	2	4	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	2	2	6	2	....	....	26	11	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Arkansas	57	T.	....	1	3	9	....	....	....	5	4	19	....	....	....	....	14	12	8	....	....	2	1	8	1	9	11	12	8	7	2	3	....	139	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	....	3	4	1	6	....	47	15	A.
California	167	T.	....	20	2	1	....	....	1	1	1	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Colorado	81	T.	....	2	5	14	5	4	....	8	4	....	....	....	2	8	2	2	1	....	....	2	4	4	8	7	7	4	9	16	5	1	....	124	23	T.
		A.	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	1	1	A.
Connecticut	21	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	8	....	10	3	T.
		A.	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	A.
Delaware	5	T.	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
Dist. of Columbia	4	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Florida	47	T.	....	....	....	3	....	....	....	....	....	1	3	6	1	....	1	..	4	8	11	10	10	2	7	3	6	3	5	1	2	8	....	95	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Georgia	55	T.	....	....	1	2	....	....	....	....	2	8	5	5	....	....	....	..	4	6	1	6	1	....	5	3	....	1	6	3	10	5	....	74	18	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Idaho	34	T.	....	2	2	....	....	..	....	....	....	....	....	1	....	....	2	....	....	....	1	1	3	1	....	....	4	1	4	1	1	1	....	25	14	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Illinois	92	T.	....	1	1	....	....	....	....	....	....	2	....	....	....	1	...	4	23	....	1	1	....	....	....	....	1	2	....	....	....	....	....	37	10	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	A.
Indiana	58	T.	1	....	....	....	....	....	....	....	....	1	..	....	....	....	1	1	10	6	....	....	3	....	....	....	....	....	....	....	....	....	....	23	7	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Indian Territory	11	T.	....	....	2	2	....	....	....	....	....	3	1	....	....	....	2	1	....	....	1	1	1	2	1	3	1	2	1	5	1	..	....	30	17	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Iowa	149	T.	....	....	....	....	....	...	....	3	2	....	....	....	....	1	1	21	12	....	....	....	....	....	....	3	9	16	10	....	1	....	....	79	11	T.
		A.	...	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Kansas	77	T.	....	3	5	8	3	1	...	5	9	8	1	....	1	2	27	7	2	1	....	1	1	15	6	16	7	11	10	12	2	2	...	166	26	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Kentucky	41	T.	....	....	....	....	....	....	....	1	1	2	4	1	....	....	....	....	....	....	1	1	2	6	1	6	...	....	1	1	....	....	....	28	13	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Louisiana	46	T.	....	....	....	....	....	..	2	8	....	10	6	....	....	3	23	20	11	4	6	3	3	14	5	2	1	3	5	8	2	7	....	146	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Maine	19	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	....	....	....	....	....	....	....	....	....	....	....	6	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
Maryland	48	T.	....	....	....	5	....	....	....	....	....	1	....	3	....	....	....	....	1	....	....	....	....	....	8	13	1	....	....	....	....	1	....	23	8	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	2	2	A.
Massachusetts	48	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4	....	4	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	1	A.
Michigan	106	T.	.	....	....	....	....	....	....	....	....	1	....	....	....	....	1	....	4	2	....	....	....	2	....	....	....	....	....	....	1	....	....	11	6	T.
		A.	....	....	....	1	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7	3	A.
Minnesota	67	T.	....	....	....	..	....	....	....	3	....	....	....	....	....	....	....	....	1	....	....	....	....	....	2	....	4	18	5	4	1	....	....	38	8	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	10	....	11	2	A.
Mississippi	41	T.	....	....	....	....	....	....	....	4	1	15	4	....	....	....	12	9	12	....	2	2	6	12	3	....	4	14	2	6	2	1	....	111	18	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Missouri	95	T.	2	4	6	2	....	....	....	3	13	16	2	....	....	....	14	12	6	1	....	....	1	6	3	8	16	13	5	4	1	....	....	138	21	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Montana	40	T.	....	2	6	1	....	1	....	1	1	1	....	1	2	1	2	....	1	....	1	....	3	3	1	1	1	2	1	....	....	....	....	33	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Nebraska	142	T.	..	....	1	....	....	....	....	1	8	4	....	....	1	5	14	12	5	1	....	....	....	6	6	18	19	17	20	10	....	....	2	....	2	1	A.
		A.	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	147	17	T.
Nevada	40	T.	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	1	..	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New Hampshire	19	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	4	3	A.
New Jersey	51	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12	....	....	....	....	....	....	1	....	13	2	T.
		A.	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	A.
New Mexico	31	T.	....	1	..	3	2	1	....	1	....	....	....	....	....	2	1	2	..	....	....	....	....	....	....	....	....	....	4	7	1	2	....	27	12	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
New York	99	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	14	1	....	....	16	11	....	....	....	....	....	....	29	....	72	6	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	1	A.
North Carolina	56	T.	....	2	6	4	....	....	....	....	....	2	10	17	3	....	....	....	5	5	....	1	1	....	2	3	10	4	1	....	1	6	....	83	18	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
North Dakota	48	T.	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	4	3	6	....	....	....	....	16	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	6	1	A.
Ohio	128	T.	....	3	1	....	....	....	....	....	....	....	1	....	....	....	....	....	4	18	....	....	....	14	33	6	....	....	....	....	....	....	....	....	80	8	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	1	....	2	2	A.
Oklahoma	23	T.	....	....	1	1	2	2	1	....	....	9	....	....	....	....	6	1	....	1	4	3	....	3	....	5	....	2	11	5	1	....	....	58	17	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Oregon	74	T.	4	....	..	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	7	3	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Pennsylvania	91	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	15	16	....	....	....	....	....	....	1	....	33	4	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	A.
Rhode Island	7	T.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	1	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
South Carolina	46	T.	....	....	6	2	....	....	..	....	6	5	9	8	....	....	....	....	9	8	3	10	10	1	2	2	2	5	7	5	8	7	....	115	20	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
South Dakota	56	T.	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	1	....	1	3	7	12	8	6	6	1	....	....	46	10	T.
		A.	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	....	7	2	A.
Tennessee	56	T.	1	3	16	24	....	....	....	2	3	15	5	1	....	....	....	....	3	....	....	7	8	5	2	....	8	6	4	1	5	....	....	119	19	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Texas	95	T.	1	....	....	1	2	11	12	1	1	1	....	....	....	....	5	6	....	4	4	5	5	22	11	15	11	2	20	4	7	12	....	163	25	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Utah	47	T.	....	..	....	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	..	1	2	2	10	8	9	3	....	....	....	37	9	T.
		A.	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Vermont	16	T.	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	....	2	1	T.
		A.	....	..	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	2	A.
Virginia	50	T.	....	....	....	1	....	....	....	....	1	...	2	2	....	....	....	....	....	....	....	....	2	5	....	1	1	....	....	1	....	1	....	17	9	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Washington	64	T.	15	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	17	3	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	....	....	1	....	....	1	....	4	4	A.
West Virginia	43	T.	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	3	....	....	5	5	....	....	....	....	....	....	....	1	....	17	5	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Wisconsin	60	T.	....	....	....	....	....	....	....	....	....	....	....	....	5	....	2	10	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	18	4	T.
		A.	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	2	....	4	3	A.
Wyoming	31	T.	....	....	7	3	....	1	1	2	....	....	....	....	....	1	1	....	....	....	....	1	7	1	1	2	4	6	2	1	....	....	....	41	16	T.
		A.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	0	A.
Sums	2,903	T.	26	47	74	88	16	22	18	60	63	131	62	49	13	32	131	115	141	84	47	60	88	200	144	102	150	172	172	130	68	112	....	2,617	....	T.
		A.	1	2	0	3	0	0	0	2	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	2	1	3	49	....	67	....	A.

TABLE VIII.—*Average hourly sunshine (in percentages), April, 1900.*

Stations.	Instrument.	Percentages for each hour of local mean time ending with the respective hour.																Hours of sunshine.			
		A. M.								P. M.								Total.			
		5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	Actual.	Possible.	Percent of possible.	Personal estimate.
																		Hours.	*Hours.*		
Albany, N. Y	T.	100	48	64	75	81	85	94	92	95	94	93	82	71	59	48	.....	315.1	402.1	78	50
Atlanta, Ga	T.	.....	43	47	60	71	80	79	80	88	87	85	76	57	41	27	.....	266.7	391.6	68	44
Atlantic City, N. J	T.	.....	44	46	62	65	70	72	72	77	72	71	63	50	37	44	.....	243.7	397.0	61	51
Baltimore, Md	T.	.....	36	37	40	54	68	78	75	74	74	72	66	59	43	39	.....	235.8	397.0	59	49
Binghamton, N. Y	T.	29	38	39	62	62	74	72	77	81	69	64	62	56	48	43	.....	246.3	401.1	61	47
Bismarck, N. Dak	P.	55	65	71	77	83	79	81	72	64	66	71	74	60	58	51	43	284.6	408.4	70	64
Boise, Idaho	P.	0	25	36	52	54	57	69	68	58	63	55	46	42	38	27	75	302.8	403.6	50	32
Boston, Mass	T.	100	52	59	63	69	65	61	60	59	61	60	56	54	47	45	.....	234.1	401.1	58	47
Buffalo, N. Y. *	T.	100	51	49	49	69	80	83	87	88	84	83	79	73	68	65	.....	224.7	309.1	73	41
Cedar City, Utah	T.	.....	23	30	36	51	66	77	82	78	70	66	48	30	22	10	.....	301.0	396.2	51	29
Charleston, S. C	T.	.....	53	57	55	55	72	71	73	67	65	57	47	36	37	34	.....	220.5	390.5	56	55
Chattanooga, Tenn	T.	.....	50	48	50	60	69	73	70	74	66	68	58	41	33	31	.....	226.5	392.7	58	49
Cheyenne, Wyo	P.	0	39	46	48	47	48	51	44	55	51	51	47	36	32	26	.....	178.9	399.4	45	37
Chicago, Ill	T.	71	49	52	55	59	66	73	77	73	75	72	65	48	36	39	.....	244.0	401.1	61	53
Cincinnati, Ohio	T.	.....	53	54	63	67	70	74	75	76	75	76	73	67	66	59	.....	271.3	397.0	68	47
Cleveland, Ohio	T.	29	40	41	47	51	58	69	72	73	71	67	59	55	38	36	.....	225.7	401.1	56	53
Columbia, Mo	T.	.....	61	59	57	62	69	74	78	79	78	64	65	54	49	36	.....	252.7	397.0	64	35
Columbus, Ohio	T.	.....	50	47	45	57	65	65	61	66	68	64	62	47	36	41	.....	222.5	398.6	56	50
Denver, Colo	P.	.....	41	55	54	58	68	69	58	53	54	53	55	53	42	43	.....	217.6	398.6	55	43
Des Moines, Iowa	T.	71	38	39	47	62	67	79	75	79	74	71	72	56	42	33	.....	243.1	401.1	61	49
Detroit, Mich	T.	0	46	43	52	68	75	77	75	69	70	67	61	52	40	41	.....	242.8	401.1	61	49
Dodge, Kans	P.	.....	25	38	44	57	62	55	52	49	52	55	58	56	46	23	.....	195.5	396.2	49	44
Dubuque, Iowa	T.	100	56	57	59	65	67	76	78	76	74	73	66	52	52	56	.....	261.0	401.1	65	54
Eastport, Me	P.	10	30	36	43	46	53	50	46	52	52	46	49	46	31	21	0	175.7	405.2	43	31
Elkins, W. Va	T.	.....	40	41	53	66	76	78	75	73	74	74	69	59	46	36	.....	249.2	397.0	63	50
Erie, Pa	T.	29	32	51	57	72	77	77	80	85	77	75	67	67	49	42	.....	269.5	401.1	67	50
Escanaba, Mich	T.	38	45	44	42	44	50	56	56	55	58	47	38	35	37	40	42	188.6	407.0	46	47
Eureka, Cal	P.	0	47	45	51	56	60	59	64	66	64	60	63	62	60	54	.....	232.4	399.4	58	52
Fresno, Cal	T.	.....	52	62	71	76	82	82	82	84	83	84	78	71	65	60	.....	295.6	394.8	75	63
Galveston, Tex	P.	.....	26	29	38	46	53	50	42	48	49	49	51	57	55	20	.....	176.1	386.4	46	35
Grand Junction, Colo	P.	.....	49	49	61	67	62	61	56	59	45	47	32	36	32	46	.....	199.6	397.0	50	34
Harrisburg, Pa	T.	.....	50	47	51	64	76	79	86	91	89	85	73	58	43	43	.....	270.4	398.6	68	46
Helena, Mont	P.	36	35	44	55	52	60	58	48	48	48	54	48	40	37	31	57	193.7	408.4	47	34
Huron, S. Dak	T.	50	47	50	48	67	72	78	79	83	79	71	65	53	47	48	100	258.3	403.6	64	56
Indianapolis, Ind	T.	.....	58	61	53	58	61	64	65	62	62	62	57	55	53	56	.....	235.4	398.6	59	46
Jacksonville, Fla	T.	.....	50	57	58	69	70	81	84	84	83	74	64	47	39	36	.....	255.0	387.4	66	57
Jupiter, Fla	T.	.....	45	59	77	94	95	94	92	98	91	89	81	66	29	16	.....	295.3	384.6	77	56
Kalispell, Mont	T.	57	23	27	44	65	78	78	79	74	73	69	65	55	34	25	60	235.6	410.4	57	57
Kansas City, Mo	P.	.....	37	34	43	54	52	55	54	47	54	49	50	46	41	43	.....	189.3	397.0	48	39
Key West, Fla	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50
Knoxville, Tenn	T.	.....	30	38	49	59	65	74	79	75	63	65	62	51	38	34	.....	226.2	393.6	57	57
Lexington, Ky	T.	.....	25	39	57	67	75	78	79	78	81	76	79	68	44	28	.....	256.1	396.2	65	62
Little Rock, Ark	T.	.....	21	25	37	54	65	71	79	72	72	58	49	42	31	23	.....	204.3	392.7	52	48
Los Angeles, Cal	P.	.....	41	51	60	52	51	60	66	62	65	67	72	76	71	62	.....	242.4	391.6	62	55
Louisville, Ky	T.	.....	21	29	38	63	68	71	75	75	77	71	69	63	36	27	.....	227.8	396.2	57	51
Macon, Ga	T.	.....	37	46	55	67	81	87	95	87	85	84	83	68	48	32	.....	276.3	390.5	71	60
Meridian, Miss	T.	.....	32	37	39	60	63	73	70	68	65	62	53	36	33	29	.....	206.8	389.9	53	44
Mount Tamalpais, Cal	P.	.....	53	56	56	62	66	69	66	65	69	70	69	61	58	55	.....	249.1	396.2	63	60
Nashville, Tenn	T.	.....	31	27	39	57	74	76	77	77	77	67	61	66	58	35	.....	222.7	393.6	57	43
New Haven, Conn	T.	100	69	69	73	73	72	76	78	74	77	73	69	67	54	36	.....	276.1	399.4	69	68
New Orleans, La	T.	.....	42	39	39	54	64	69	67	66	69	65	62	46	41	44	.....	215.9	387.4	56	53
New York, N. Y	T.	0	55	58	64	68	76	82	82	83	79	74	70	60	56	58	.....	277.9	399.4	70	49
Norfolk, Va	T.	.....	50	50	51	55	66	68	73	80	79	71	66	59	47	44	.....	246.1	394.8	62	55
Northfield, Vt	P.	67	45	45	54	55	55	51	52	50	48	46	46	44	43	38	25	195.0	403.6	48	36
Oklahoma, Okla	T.	.....	27	31	30	53	57	64	69	76	79	78	69	58	45	42	.....	223.8	392.7	57	35
Omaha, Nebr	T.	100	29	31	48	60	73	78	78	76	72	68	58	46	27	19	.....	224.4	399.4	56	39
Parkersburg, W. Va	T.	.....	35	35	55	67	71	72	73	67	72	73	71	53	33	31	.....	235.0	397.0	59	61
Phenix, Ariz	P.	.....	57	64	66	76	83	82	75	72	71	74	72	68	57	48	.....	274.2	390.5	70	61
Philadelphia, Pa	T.	.....	56	64	59	65	68	67	68	70	69	63	51	51	52	52	.....	244.4	398.6	61	43
Pittsburg, Pa	T.	100	42	37	41	53	68	67	63	67	63	52	48	50	41	39	.....	210.8	399.4	53	54
Pocatello, Idaho	T.	0	12	19	29	32	51	64	64	61	58	53	37	34	25	18	.....	164.1	402.1	41	33
Portland, Me	T.	0	6	24	56	64	71	72	72	61	63	57	54	54	41	23	0	212.8	403.6	53	53
Portland, Oreg	T.	62	26	31	36	47	53	60	53	63	66	54	47	39	36	34	50	190.1	407.0	47	46
Pueblo, Colo	T.	.....	58	58	62	69	73	75	78	74	75	62	49	35	22	22	.....	233.7	396.2	59	46
Raleigh, N. C	T.	.....	47	48	57	65	70	80	83	79	73	70	64	58	42	43	.....	252.0	393.6	64	56
Rochester, N. Y	T.	50	47	43	49	59	63	74	71	68	66	68	70	60	46	31	.....	237.8	402.1	59	55
St. Louis, Mo	T.	.....	49	50	58	64	69	73	72	76	84	82	77	75	58	50	.....	269.9	397.0	68	51
St. Paul, Minn	P.	31	35	46	59	62	69	77	75	73	74	73	75	71	62	43	70	262.6	405.2	65	52
Salt Lake City, Utah	T.	100	22	24	37	54	67	72	78	68	73	62	54	48	30	24	.....	209.3	399.4	52	47
San Diego, Cal	P.	.....	57	50	53	62	79	76	79	77	78	79	72	68	66	57	.....	269.1	390.5	69	70
San Francisco, Cal	T.	.....	55	54	53	61	71	70	75	88	85	86	79	63	45	44	.....	266.5	396.2	67	62
Santa Fe, N. Mex	P.	.....	56	67	78	77	80	84	76	80	73	74	69	69	57	41	.....	281.1	393.6	71	57
Sault Ste. Marie, Mich	T.	25	43	48	58	65	73	70	73	79	78	78	69	63	55	50	50	263.9	407.0	65	53
Savannah, Ga	T.	.....	43	50	54	63	70	70	73	73	72	64	52	44	40	37	.....	229.7	389.9	59	57
Seattle, Wash	T.	57	28	33	44	49	62	67	79	84	83	74	67	58	41	30	70	237.0	410.4	58	46
Spokane, Wash	T.	43	30	28	46	61	68	75	73	70	69	60	57	44	40	38	80	234.6	410.4	55	36
Tacoma, Wash	T.	73	30	34	37	46	70	67	64	76	76	67	71	61	44	28	29	228.1	408.4	56	35
Tampa, Fla	T.	.....	18	27	26	30	57	69	75	71	66	68	63	42	33	29	.....	193.9	385.4	50	50
Toledo, Ohio	T.	0	38	47	63	76	81	80	85	78	76	76	73	61	45	38	.....	268.1	401.1	67	56
Topeka, Kans	T.	.....	32	37	36	43	49	52	54	55	49	43	42	26	20	16	.....	160.6	397.0	40	35
Vicksburg, Miss	T.	.....	49	50	51	66	75	75	75	74	80	71	65	58	48	47	.....	251.3	389.9	64	42
Washington, D. C	P.	.....	34	35	44	57	62	64	66	69	71	73	69	65	52	52	.....	234.3	397.0	59	55
Wilmington, N. C	T.	.....	28	30	50	59	70	76	78	70	68	64	57	49	38	36	.....	222.5	391.6	57	55
Yankton, S. Dak	T.	50	21	32	48	59	69	72	66	69	74	65	55	56	44	38	.....	224.8	402.1	56	39
Basseterre, St. Kitts	T.	.....	41	41	61	69	80	85	87	88	94	94	88	66	52	40	.....	277.9	376.2	74	44
Bridgetown, Barbados	T.	.....	2	34	67	87	95	97	94	92	92	85	75	68	48	33	.....	282.2	373.1	76	44
Cienfuegos, Cuba *	T.	.....	60	61	68	90	97	98	98	100	100	93	78	45	38	33	.....	230.4	298.2	79	72
Havana, Cuba	T.	.....	51	48	51	71	78	84	91	84	81	70	55	32	32	32	.....	241.9	381.5	63	39
Kingston, Jamaica, W. I	T.	.....	58	64	78	90	86	86	88	83	83	67	52	36	22	20	.....	257.4	376.9	68	43
Port of Spain, Trinidad, W. I	T.	.....	34	40	39	48	50	55	56	58	49	44	42	37	37	40	.....	170.6	371.6	46	36
Puerto Principe, Cuba	T.	.....	49	45	49	77	80	79	81	77	71	59	48	30	27	26	.....	223.8	379.5	59	49
Roseau, Dominica, W. I	T.	.....	21	21	47	72	74	80	86	92	93	87	82	68	55	41	.....	261.0	374.8	70	51
San Juan, Puerto Rico	T.	.....	18	31	42	61	73	84	79	82	82	68	63	57	33	10	.....	229.0	376.9	61	57
Santiago de Cuba, Cuba	T.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50
Santo Domingo, Santo Domingo	T.	.....	58	57	53	54	63	71	67	70	74	59	51	36	33	33	.....	213.8	376.9	57	54
Willemstad, Curaçao	T.	.....	30	27	30	47	67	71	70	73	77	73	70	55	33	33	.....	211.9	372.6	57	54

*Record for 23 days.

TABLE IX.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.75 in 1 hour during April, 1900, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration.		Total amt of precipitation.	Excessive rate.		Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated.													
		From—	To—		Began—	Ended—		5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.	22			0.39														0.11			
Atlanta, Ga.	23-24	1.26 p. m.	12.45 a. m.	1.49	5.25 p. m.	6.20 p. m.	0.34	0.06	0.14	0.18	0.21	0.24	0.29	0.32	0.38	0.49	0.67	0.75			
Atlantic City, N. J.	11-12			0.90														*			
Baltimore, Md.	11-12			0.60														0.24			
Binghamton, N. Y.	21-22			0.24														0.16			
Bismarck, N. Dak.	28-29			0.42														0.18			
Boise, Idaho	25			0.46														0.39			
Boston, Mass.	3			0.44														0.13			
Buffalo, N. Y	11			0.18														0.16			
Cairo, Ill.	10			0.43														0.19			
Charleston, S. C.	27	5.33 p. m.	6.22 p. m.	0.75	5.40 p. m.	5.55 p. m.	T.	0.15	0.51	0.71	0.72										
Chicago, Ill.	17			0.32														*			
Cincinnati, Ohio	17			0.67														0.13			
Cleveland, Ohio	11			0.32														0.24			
Columbia, Mo.	9-10			0.81														0.29			
Columbus, Ohio	17			0.63														0.21			
Denver, Colo.	14-16			2.33														0.19			
Des Moines, Iowa	17	2.00 p. m.	4.30 p. m.	1.02	2.05 p. m.	3.00 p. m.	T.	0.05	0.18	0.50	0.74	0.74	0.74	0.74	0.75	0.87	0.94	1.00			
Detroit, Mich.	17-18			0.64														0.14			
Dodge, Kans	10-11			1.35														0.37			
Duluth, Minn.	17			0.22														*			
Eastport, Me.	18			0.83														0.12			
Elkins, W. Va.	2			0.30														0.12			
Erie, Pa.	22-23			0.51														0.21			
Escanaba, Mich.	16 17			1.54														0.22			
Evansville, Ind	10			0.31														0.13			
Fort Worth, Tex.	27-28			2.42														0.60			
Fresno, Cal.	20-21			0.55														0.14			
Galveston, Tex.	27-28	3.02 p. m.	8.04 a. m.	2.61	8.00 p. m.	9.00 p. m.	0.25	0.03	0.07	0.12	0.24	0.41	0.56	0.81	1.39	1.76	1.97	2.21	2.25		
Grand Junction, Colo.	4			0.29														*			
Harrisburg, Pa.	23			0.39										0.39							
Hatteras, N. C.	12	2.05 a. m.	4.30 a. m.	0.91	3.27 a. m.	4.10 a. m.	0.10	0.05	0.25	0.42	0.45	0.51	0.57	0.67	0.76	0.80					
Huron, S. Dak.	25-26			0.89														*			
Indianapolis, Ind.	11			0.62														0.25			
Jacksonville, Fla.	18-19	4.25 p. m.	D. N.	4.68	8.35 p. m.	10.35 p. m.	0.40	0.26	0.37	0.44	0.52	0.68	0.83	0.97	1.04	1.08	1.13	1.19	1.50	1.69	2.04
					11.30 p. m.	1.30 a. m.	2.66	0.05	0.10	0.13	0.19	0.31	0.36	0.47	0.59	0.83	1.07	1.22	1.36	1.49	1.62
Jupiter, Fla.	25			1.02														0.56			
Kalispell, Mont	21-22			0.34														0.19			
Kansas City, Mo.	15-16	3.52 p. m.	D. N	1.29	5.10 p. m.	5.30 p. m.	0.19	0.05	0.15	0.23	0.43	0.45	0.46	0.48	0.52						
Key West, Fla.	18			0.45														0.41			
Knoxville, Tenn	9			0.25									0.25								
Lexington, Ky.	20			0.26														0.15			
Lincoln, Nebr.	27-28			0.56														0.37			
Little Rock, Ark.	10			0.91														0.51			
Los Angeles, Cal.	20			0.21														0.08			
Louisville, Ky.	11			0.84														0.24			
Macon, Ga.	18	3.48 a. m.	2.04 p. m.	3.47	8.00 a. m.	9.05 a. m.	0.80	0.07	0.11	0.15	0.22	0.42	0.57	0.63	0.70	0.78	0.85	0.96	1.05		
					10.05 a. m.	10.55 a. m.	1.93	0.10	0.20	0.29	0.30	0.32	0.34	0.41	0.50	0.67	0.79	0.85	0.98		
Memphis, Tenn.	8-9	11.20 p. m.	7.45 a. m.	0.67	11.25 p. m.	11.37 p. m.	T.	0.36	0.50	0.55	0.56										
Meridian, Miss.	10-11	10.40 p. m.	D. N.	1.55	12.03 a. m.	12.45 a. m.	0.16	0.45	0.71	0.80	0.85	0.91	0.96	0.99	1.07	1.10	1.11	1.14	1.20		
Do	16-17	D. N.	8.10 a. m.	10.17	10.45 a. m.	11.35 a. m.	1.88	0.20	0.32	0.44	0.52	0.55	0.65	0.70	0.79	0.81	0.86				
					11.35 a. m.	12.25 p. m.	.....	0.95	1.06	1.12	1.24	1.35	1.58	1.67	1.72	1.76	1.89				
					12.25 p. m.	†	.....	2.01	2.16	2.24	2.26	2.28	2.29	2.30	2.32	2.33	2.35	2.37	2.44	2.50	†2.80
Do	23	12.02 a. m.	6.30 a. m.	1.84	2.05 a. m.	2.45 a. m.	0.26	0.17	0.36	0.41	0.48	0.58	0.66	0.79	0.94	0.97	1.00	1.03			
Milwaukee, Wis.	16-17			0.96														*			
Montgomery, Ala.	17	7.35 a. m.	12.20 p. m.	1.17	9.07 a. m.	9.35 a. m.	0.09	0.14	0.38	0.58	0.72	0.78	0.81	0.84	0.87	0.88	0.90	0.92	0.94	0.99	1.05
Nantucket, Mass.	12-13			0.93														0.15			
Nashville, Tenn.	3			0.71														0.31			
New Orleans, La.	11	4.30 a. m.	6.10 a. m.	0.85	5.00 a. m.	5.25 a. m.	0.14	0.05	0.25	0.44	0.62	0.67	0.69								
Do	17	8.10 a. m.	4.25 p. m.	3.08	8.15 a. m.	9.05 a. m.	0.03	0.06	0.14	0.18	0.32	0.39	0.60	0.68	0.71	0.81	0.90				
					9.05 a. m.	10.30 a. m.	.....	0.92	0.94	0.97	1.01	1.07	1.17	1.50	1.85	1.94	2.06	2.28	2.52	2.83	
New York, N. Y.	11-12			0.92														0.25			
Norfolk, Va.	19			1.44														0.56			
Northfield, Vt.	17-18			0.40														*			
Oklahoma, Okla.	27-28			1.40														0.23			
Omaha, Nebr.	15-16			0.79														*			
Parkersburg, W. Va.	16-17			0.42														0.10			
Philadelphia, Pa.	18-19			0.48														0.25			
Pittsburg, Pa.	22-23			0.51														0.25			
Pocatello, Idaho	22-23			1.41														0.15			
Portland, Me.	18-19			0.71														0.23			
Portland, Oreg.	11			0.43														0.16			
Pueblo, Colo.	3-5			3.15														0.28			
Raleigh, N. C.	11-12			1.59														0.64			
Richmond, Va.	18-19			2.27														0.43			
Rochester, N. Y.	17-18			0.46														0.16			
St. Louis, Mo.	10			0.55														0.18			
St. Paul, Minn.	17-18			1.00														0.27			
Salt Lake City, Utah	7-8			0.96														0.16			
San Diego, Cal.	27			0.79														0.40			
San Francisco, Cal.	11-12			0.23														0.14			
Savannah, Ga.	18-19			1.89														0.46			
Seattle, Wash.	5-6			0.75														0.20			
Spokane, Wash.	6-7			0.52														*			
Tampa, Fla.	21-22	9.07 p. m.	2.00 a. m.	0.69	10.10 p. m.	10.32 p. m.	0.10	0.05	0.30	0.45	0.50										
Toledo, Ohio	18			0.52														0.44			
Topeka, Kans.	15			1.02														0.46			
Vicksburg, Miss.	15-17			5.50														*			
Washington, D. C.	18-19			0.80														0.22			
Wilmington, N. C.	19			1.06														0.25			
Yankton, S. Dak	15-16			1.39														0.31			
Basseterre, St. Kitts	29	7.40 a. m.	10.36 a. m.	0.92	9.30 a. m.	9.55 a. m.	0.13	0.11	0.32	0.50	0.66	0.74	0 75								
Bridgetown, Barbados	23-24	11.25 p. m.	D. N.	0.62	12.26 a. m.	12.55 a. m.	0.01	0.12	0.20	0.24	0.29	0.41	0.53								
Kingston, Jamaica	23-24			1.03														0.34			
Port of Spain, Trin.	29	8.10 a. m.	9.20 a. m.	0.85	8.17 a. m.	8.50 a. m.	T.	0 21	0.33	0.54	0.67	0.71	0.75	0.78	0.82						
Puerto Principe, Cuba	27	3.30 p. m.	5.30 p. m.	0.97	3.59 p. m.	4.14 p. m.	0.01	0.47	0.61	0.80	0.82	0.84	0.86	0.88	0.90	0.91	0.93	0.95			
San Juan, Puerto Rico	30	2.10 p. m.	8.30 p. m.	1.33	2.30 p. m.	3.30 p. m.	0.12	0.05	0.19	0.25	0.27	0.29	0.34	0.39	0.45	0.62	0.83	0.98	1.05	1.11	
Santiago de Cuba	15	5.26 p. m.	6.40 p. m.	1.18	5.29 p. m.	6.00 p. m.	T.	0.06	0.11	0.32	0.43	0.68	0.85	0.93							
Santo Domingo, S. D.	30	7.00 p. m.	8.25 p. m	1.44	7.13 p. m.	7.40 p. m.	0.09	0.21	0.55	0.88	1.11	1.16	1.20	1.23	1.25	1.28					

* Self-register not working. † Self-register failed to recor l correctly after 2:30 p. m. Heavy rain continued at intervals during the afternoon and night. Total precipitation for the storm 10.17 inches.

TABLE X.—*Data furnished by the Canadian Meteorological Service, April, 1900.*

Stations.	Pressure.			Temperature.				Precipitation.		
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F.	29.64	29.79	−.10	37.2	+ 2.7	43.8	30.6	6.98	+2.89	1.3
Sydney, C. B. I.	29.76	29.80	−.07	37.4	+ 2.4	44.7	30.1	7.51	+3.71	8.5
Halifax, N. S.	29.74	29.85	−.03	40.8	+ 3.0	48.6	33.1	4.04	+0.73	7.4
Grand Manan, N. B.	29.84	29.89	−.01	41.8	+ 2.6	48.8	34.8	3.10	−0.30	0.5
Yarmouth, N. S.	29.82	29.90	−.01	40.4	+ 1.5	46.7	34.0	4.18	+1.24	5.7
Charlottet'n, P. E. I.	29.77	29.81	−.09	37.2	+ 2.0	43.8	30.6	4.70	+1.78	27.0
Chatham, N. B.	29.83	29.85	−.07	37.2	+ 1.7	45.7	28.7	2.68	−0.42	9.1
Father Point, Que.	29.88	29.91	−.01	33.2	0.0	40.9	25.6	1.45	−0.57	4.7
Quebec, Que.	29.61	29.95	.00	39.0	+ 3.9	47.2	30.7	0.91	−1.48	1.3
Montreal, Que.	.....	.....	.....	.....	.....	.....	.....	.....	.....	...
Bissett, Ont.	29.43	30.04	+.08	43.1	+ 5.6	57.3	29.0	1.33	+0.09	5.4
Ottawa, Ont.	29.63	29.95	−.01	44.4	+ 4.4	54.9	34.0	0.76	.....	0.0
Kingston, Ont.	29.70	30.02	+.05	43.6	+ 3.6	52.8	34.5	1.16	−0.79	1.5
Toronto, Ont.	29.66	30.04	+.05	45.5	+ 4.7	54.4	36.6	1.82	−0.06	T.
White River, Ont.	28.75	30.12	+.08	38.5	+ 5.5	54.2	22.8	2.04	+0.86	0.8
Port Stanley, Ont.	29.40	30.05	+.05	44.0	+ 3.0	53.2	34.8	1.99	−0.14	1.5
Saugeen, Ont.	29.34	30.07	+.07	41.6	+ 2.9	49.5	33.8	1.25	−0.58	0.5
Parry Sound, Ont.	29.34	30.05	+.07	42.5	+ 4.9	54.3	30.7	1.01	−0.71	1.2
Port Arthur, Ont.	29.36	30.07	+.04	40.6	+ 7.1	51.3	29.9	0.50	−0.87	0.0
Winnipeg, Man.	29.21	30.03	−.01	47.9	+12.0	64.2	31.6	0.30	−1.05	0.0
Minnedosa, Man.	28.22	30.04	+.04	47.6	+11.6	61.9	33.4	1.06	−0.06	0.0
Qu'Appelle, Assin.	27.71	29.96	−.01	47.8	+10.4	61.5	34.2	0.29	−0.77	0.0
Medicine Hat, Assin.	27.64	29.92	−.01	50.5	+ 6.0	65.0	36.0	1.25	+0.74	0.0
Swift Current, Assin.	27.39	29.96	−.01	48.7	+ 7.4	62.4	35.0	0.42	−0.76	0.4
Calgary, Alberta	26.36	29.90	−.08	44.1	+ 4.5	57.7	30.5	2.04	+1.42	5.8
Banff, Alberta	25.30	29.95	.....	41.6	+ 6.3	53.5	29.7	1.49	+0.24	7.3
Edmonton, Alberta	27.58	29.88	−.05	46.4	+ 6.5	7.7	35.1	2.60	+2.03	2.8
Prince Albert, Sask.	28.40	29.95	.....	44.5	+ 8.4	58.0	31.1	1.16	+0.31	4.0
Battleford, Sask.	28.23	29.97	.....	45.2	+ 8.0	57.1	33.3	0.68	+0.20	2.4
Kamloops, B. C.	28.72	29.99	.....	51.3	+ 2.4	62.3	40.3	0.18	−0.32	0.0
Victoria, B. C.	29.92	30.01	.....	50.8	+ 4.3	57.9	43.6	0.87	.....	0.0
Barkerville, N. W. T.	25.58	29.90	.....	40.4	+ 7.3	52.7	28.0	0.76	−1.21	0.4
Hamilton, Bermuda.	29.87	30.03	+.01	64.0	+ 0.1	69.8	58.2	1.59	−2.87	0.0

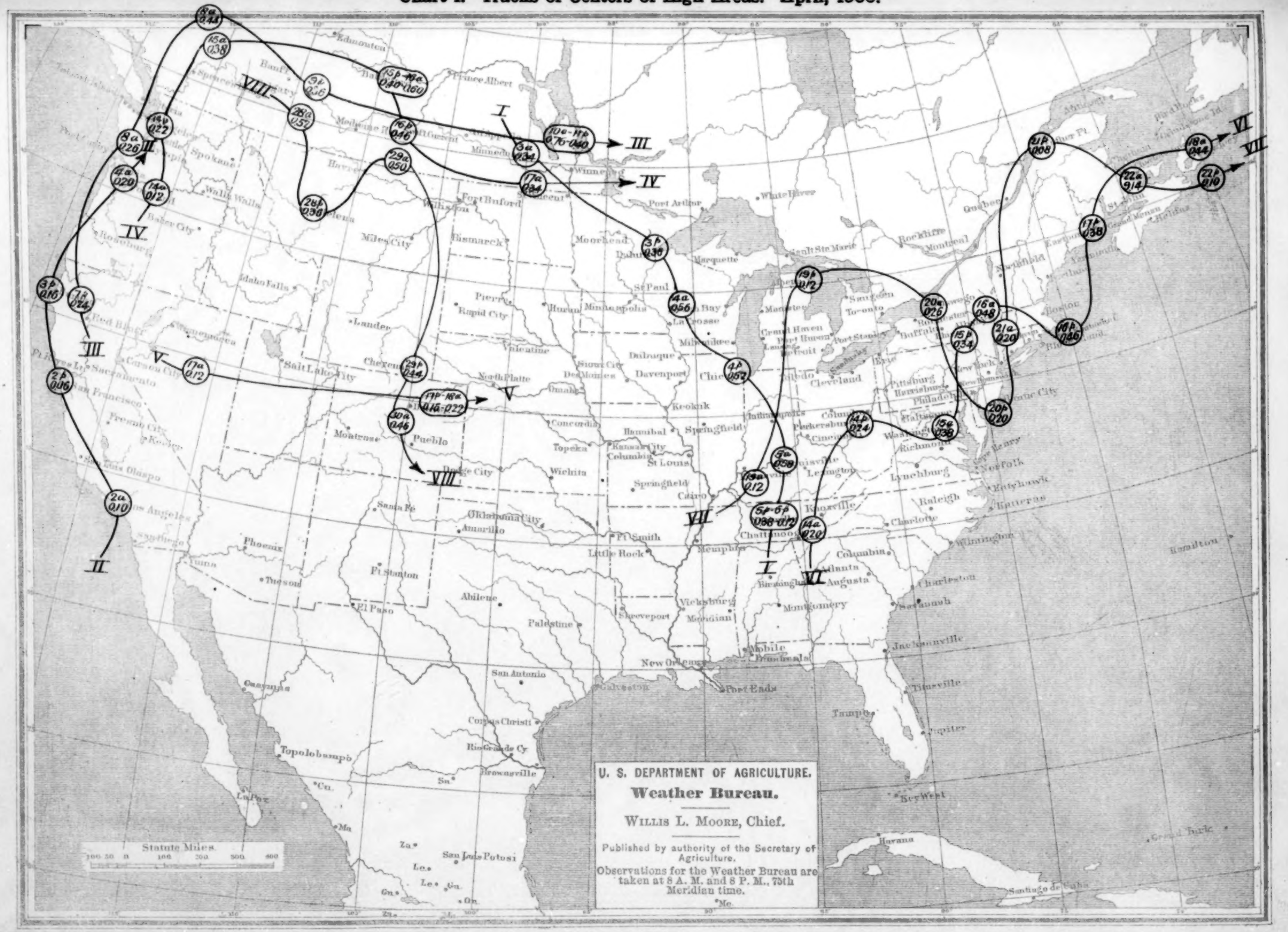
TABLE XI.—*Heights of rivers referred to zeros of gages, April, 1900.*

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn	1,954	14	5.6	7,8	3.0	2	4.2	2.6
Reeds Landing, Minn	1,884	12	6.2	23	1.3	1	4.0	4.9
La Crosse, Wis	1,819	12	8.5	25	5.5	5	6.9	3.0
Prairie du Chien	1,759	18	10.5	30	5.4	2	7.5	5.1
Dubuque, Iowa	1,699	15	10.8	30	6.1	4-6	7 5	4.7
Leclaire, Iowa	1,609	10	5.9	4	4.0	1	5.1	1.9
Davenport, Iowa	1,593	15	7.9	20	5.4	15	6.7	2.5
Muscatine, Iowa	1,562	16	9.7	4,21	5.9	1	8.3	3.8
Galland, Iowa	1,472	8	5.4	5,6	3.2	1	4.4	2.2
Keokuk, Iowa	1,463	15	9.0	5,6	5.5	1	7.4	3.5
Hannibal, Mo	1,402	13	10.2	7	6.3	1,2	8.7	3.9
Grafton, Ill	1,306	28	13.6	8,9	11.0	18,19	12.2	2.6
St. Louis, Mo	1,264	30	18 6	15	13.5	1	16 1	5.1
Chester, Ill	1,189	30	14.4	16	10.6	1,2	12.5	3.8
Memphis, Tenn	843	33	24.5	1	17.6	10	20.2	6.9
Helena, Ark	767	42	33.8	1	25.7	12	28.7	8.1
Arkansas City, Ark	635	42	36.7	1	28.4	16,17	31.5	8.3
Greenville, Miss	595	42	31.5	1	23.7	16,17	26.6	7.8
Vicksburg, Miss	474	45	36.6	1	28.9	16	32.0	7.7
New Orleans, La	108	16	13.5	1	11.6	15	12.8	1.9
Missouri River.								
Bismarck, N. Dak	1,309	14	12.8	3	2.8	16,17	4.4	10.0
Pierre, S. Dak	1,114	14	8.5	6	3.4	20,21	4.5	5.1
Sioux City, Iowa	784	19	12.4	8	7.0	24,25	8.1	5.4
Omaha, Nebr	669	18	11.7	9	7.7	25-27	8 6	4.0
Plattsmouth, Nebr	641	17	7 8	10	5.2	23,25,26	5 9	2.6
St. Joseph, Mo	481	10	6.9	11	3.3	1	4.4	3.6
Kansas City, Mo	388	21	14.4	11	9.1	2	10.9	5.3
Boonville, Mo	199	20	12.0	13	8.0	3,4	9.2	4.0
Hermann, Mo	103	24	12.7	14	7.1	5	9.5	5.6
Des Moines River.								
Des Moines, Iowa	150	19	4.1	1,2	3.4	29	3.8	0.7
Illinois River.								
Peoria, Ill	135	14	16.9	4,5	11.9	30	14.3	5.0
Beardstown, Ill	70	12	15.5	1	11.7	30	13 6	3.8
Osage River.								
Bagnell, Mo	70	28	10.0	13	1.7	9	4.8	8.3
Gasconade River.								
Arlington, Mo	58	16	2.9	11	— 1.0	1-9	0.7	3.9
Youghiogheny River.								
Confluence, Pa	59	10	2.1	3	1.1	{20, 22, 29, 30}	1.5	1.0
West Newton, Pa	15	23	3.5	3	1.1	30	2.1	2.4
Allegheny River.								
Warren, Pa	177	14	5.6	9, 10	2.0	30	3.9	3.6
Oil City, Pa	123	13	5.7	9	2.7	30	3.9	3.0
Parker, Pa	73	20	6.3	9	2.7	30	4.2	3.6
Monongahela River.								
Weston, W. Va	161	18	0.9	18	— 0.4	29,30	0.2	1.3
Fairmont, W. Va	119	25	3.9	1	0.8	30	1.4	3.1
Greensboro, Pa	81	18	10.5	1	7.3	30	8.5	3.2
Lock No. 4, Pa	40	28	12.3	1	7.0	17, 18, 30	8.5	5.3
Conemaugh River.								
Johnstown, Pa	64	7	2.6	1	1.7	30	2.1	0.9
Red Bank Creek.								
Brookville, Pa	35	8	2.2	12, 13	2.0	{1-11, 15-30}	2.0	0.2
Beaver River.								
Ellwood Junction, Pa	10	14	4.2	1	3.2	29,30	3.7	1.0
Great Kanawha River.								
Charleston, W. Va	61	30	7.7	20	4.2	18	6.0	3.5
New River.								
Hinton, W. Va	95	14	4.8	23	2.1	17, 18	3.1	2.7
Cheat River.								
Rowlesburg, W. Va	36	14	5.0	10, 19	3.0	24-30	3.8	2.0
Ohio River.								
Pittsburg, Pa	966	22	8.2	10	3.8	30	6.2	4.4
Davis Island Dam, Pa	960	25	9.2	10	5.7	30	7.7	3.5
Wheeling, W. Va	875	36	11.0	11	7.0	30	9.2	4.0
Parkersburg, W. Va	785	36	11.8	3	7.4	30	9.8	4.4
Point Pleasant, W. Va	703	39	14.5	1	7.8	19	11.5	6.7
Huntington, W. Va	660	50	18.7	1,3	11.5	19	15.4	7.2
Catlettsburg, Ky	651	50	18.8	1	10.5	19	14.9	8.3
Portsmouth, Ohio	612	50	20.1	1	11.7	20	15.8	8.4
Cincinnati, Ohio	499	50	22.7	2	13.9	21	17.8	8.8
Madison, Ind	413	46	20.1	1	13.1	22,23	16.0	7.0
Louisville, Ky	367	28	9.3	1	7.3	23	8.2	2.0
Evansville, Ind	184	35	20.7	1	12.5	24	14.7	8.2
Paducah, Ky	47	40	24.2	1	16.5	11	20.1	7.7
Cairo, Ill	1,073	45	31.3	27	25.2	9, 11, 12	27.9	6.1
Muskingum River.								
Zanesville, Ohio	70	20	11.1	3	7.6	30	9.1	3.5
Scioto River.								
Columbus, Ohio	110	17	5.9	23	2.8	30	3.9	3.1
Miami River.								
Dayton, Ohio	69	18	3.4	19	1.5	11, 29, 30	2.1	1.9
Wabash River.								
Mount Carmel, Ill	50	15	7.8	4-6	4.2	16	5.8	3.6
Licking River.								
Falmouth, Ky	30	25	2.9	1	1.5	25-30	2.0	1.4
Clinch River.								
Speers Ferry, Va	156	20	1.8	1	0.2	28	0.7	1.6
Clinton, Tenn	46	25	8.0	21	5.0	{10, 12, 13 15, 16}	5.9	3.0
Tennessee River.								
Knoxville, Tenn	614	29	6.4	23	2.2	18	3.6	4.2
Kingston, Tenn	534	25	6.5	22, 23	3.0	16	4.4	3.5
Chattanooga, Tenn	430	33	12.1	22	6.0	10	8.2	6.1

Stations.	Distance to mouth of river.	Danger line on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Tennessee River—Con'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Bridgeport, Ala	390	24	11.5	18	4.7	10, 11	7.0	6.8
Florence, Ala	220	16	19.2	19,20	5.9	6	10.2	13.3
Riverton, Ala	190	25	31.4	21	7.5	6	15.8	23.9
Johnsonville, Tenn	94	21	29.1	23	9.3	7,8	17.5	19.8
Cumberland River.								
Burnside, Ky	434	50	7.0	24	3.7	16	5.0	3.3
Carthage, Tenn	257	40	16.8	24	5.4	11, 17	8.3	11.4
Nashville, Tenn	175	40	30.0	24	9.3	16	12.6	10.7
Arkansas River.								
Wichita, Kans	736	10	7.0	22	2.1	3,4	4.2	4.9
Webbers Falls, Ind. T	413	23	7.4	21,29	2.4	3-5, 8, 9	4.3	5.0
Fort Smith, Ark	351	22	9.0	30	2.8	6,7	5.6	6.2
Dardanelle, Ark	256	21	9.2	25	2.0	6-8	5 4	7.2
Little Rock, Ark	176	23	11.3	28	3.8	9	6.7	7.5
White River.								
Newport, Ark	150	26	14.6	30	4.0	7-11	7.3	10.6
Yazoo River.								
Yazoo City, Miss	80	25	23.0	30	15.6	10	19.8	7.4
Red River.								
Arthur City, Tex	688	27	17.5	30	4.8	9	8.3	12.7
Fulton, Ark	565	28	14.2	19	4.9	12	9.8	9.3
Shreveport, La	449	29	11.4	29	2.7	15, 16	6.6	8.7
Alexandria, La	139	33	19.8	25	5.4	15	12.6	14.4
Ouachita River.								
Camden, Ark	340	39	25.5	30	6.3	10	13.4	19.2
Monroe, La	100	40	30.8	30	15.0	13, 14	23.4	15.8
Atchafalaya River.								
Melville, La	100	31	30.3	1	28.0	15, 16	29.6	2.3
Susquehanna River.								
Wilkesbarre, Pa	178	14	12.1	24	2.4	1-3	6.7	9.7
Harrisburg, Pa	70	17	7.3	21	4.0	2	5.4	3.3
W. Br. of Susquehanna.								
Williamsport, Pa	35	20	6.9	19	3.6	30	5.0	3.3
Juniata River.								
Huntingdon, Pa	80	24	4.8	19	3.8	1-18, 30	3.9	1.0
Potomac River.								
Harpers Ferry, W. Va	170	16	4.0	2	2.6	{20, 21 29, 30}	3.0	1.4
James River.								
Lynchburg, Va	257	18	4.7	22	1.2	16, 17	2.3	3.5
Richmond, Va	110	12	5.3	20	— 1.3	16	0.3	6.6
Roanoke River.								
Weldon, N. C	90	40	35.5	21	8.8	11	14.1	26.7
Cape Fear River.								
Fayetteville, N. C	100	38	44 0	21, 22	5.6	12	15.4	38.4
Lumber River.								
Fairbluff, N. C	10	6	6.5	27-29	3.4	16, 17	4.8	3.1
Edisto River.								
Edisto, S. C	75	6	6.6	25, 26	3.5	16, 17	4.7	3.1
Pedee River.								
Cheraw, S. C	145	27	32.1	21	2.7	11	10.4	29.4
Black River.								
Kingstree, S. C	60	12	11.9	26	4.9	18	7.8	7.0
Lynch Creek.								
Effingham, S. C	35	12	16.6	25	5.5	18	9.4	11.1
Santee River.								
St. Stephens, S. C	50	12	15.5	29	6.8	19	8.8	8.7
Congaree River.								
Columbia, S. C	37	15	20.6	23	1.0	10, 17	5.2	19.6
Wateree River.								
Camden, S. C	45	24	28.4	23	5.7	17, 18	12.1	22.7
Waccamaw River.								
Conway, S. C	40	7	6.0	30	3.1	18, 20	4.1	2.9
Savannah River.								
Calhoun Falls, S. C	347	.....	10.4	22	3.3	7, 10	4.4	7.1
Augusta, Ga	208	32	28.0	22	8.8	10, 17	13.5	19.2
Broad River.								
Carlton, Ga	30	.....	12.2	22	2.7	10	4.4	9.5
Flint River.								
Albany, Ga	80	20	15.2	26	4.3	10-12	8.5	10.9
Chattahoochee River.								
Westpoint, Ga	239	20	9.2	25	3.8	10	5.5	5.4
Ocmulgee River.								
Macon, Ga	125	20	18.0	19	4.1	9, 10	7.9	13.9
Oconee River.								
Dublin, Ga	60	30	17.6	24	3.3	11	8.4	14.3
Coosa River.								
Rome, Ga	225	30	13.6	21	3.5	10	6.7	10.1
Gadsden, Ala	144	18	22.5	19	4.0	9	11.2	18.5
Alabama River.								
Montgomery, Ala	265	35	36.5	22	7.3	6-11	18.6	29.2
Selma, Ala	212	35	41.0	23	7.8	7	22.6	33.2
Tombigbee River.								
Columbus, Miss	303	33	27.6	19	0.5	10	13.7	27.1
Demopolis, Ala	155	35	68.7	22	12.6	11	44.3	56 1
Black Warrior River.								
Tuscaloosa, Ala	129	43	65.0	18	10.0	9	34.1	55.0
Columbia River.								
Umatilla, Oreg	270	25	12.2	24	8 5	1	11.1	3.7
The Dalles, Oreg	166	40	19.3	23, 24	13.5	1, 2	17.3	5.8
Willamette River.								
Albany, Oreg	99	20	10.2	1	4.0	26-30	5.6	6.2
Portland, Oreg	10	15	10.9	1	8.8	9	10.0	2.1
Sacramento River.								
Red Bluff, Cal	241	23	6.6	21	3.3	1	4.8	3.3
Sacramento, Cal	70	29	22.0	4	18.5	30	20.3	3.5

Chart I. Tracks of Centers of High Areas. April, 1900.

Chart I. Tracks of Centers of High Areas. April, 1900.



U. S. DEPARTMENT OF AGRICULTURE.

Weather Bureau.

WILLIS L. MOORE, Chief.

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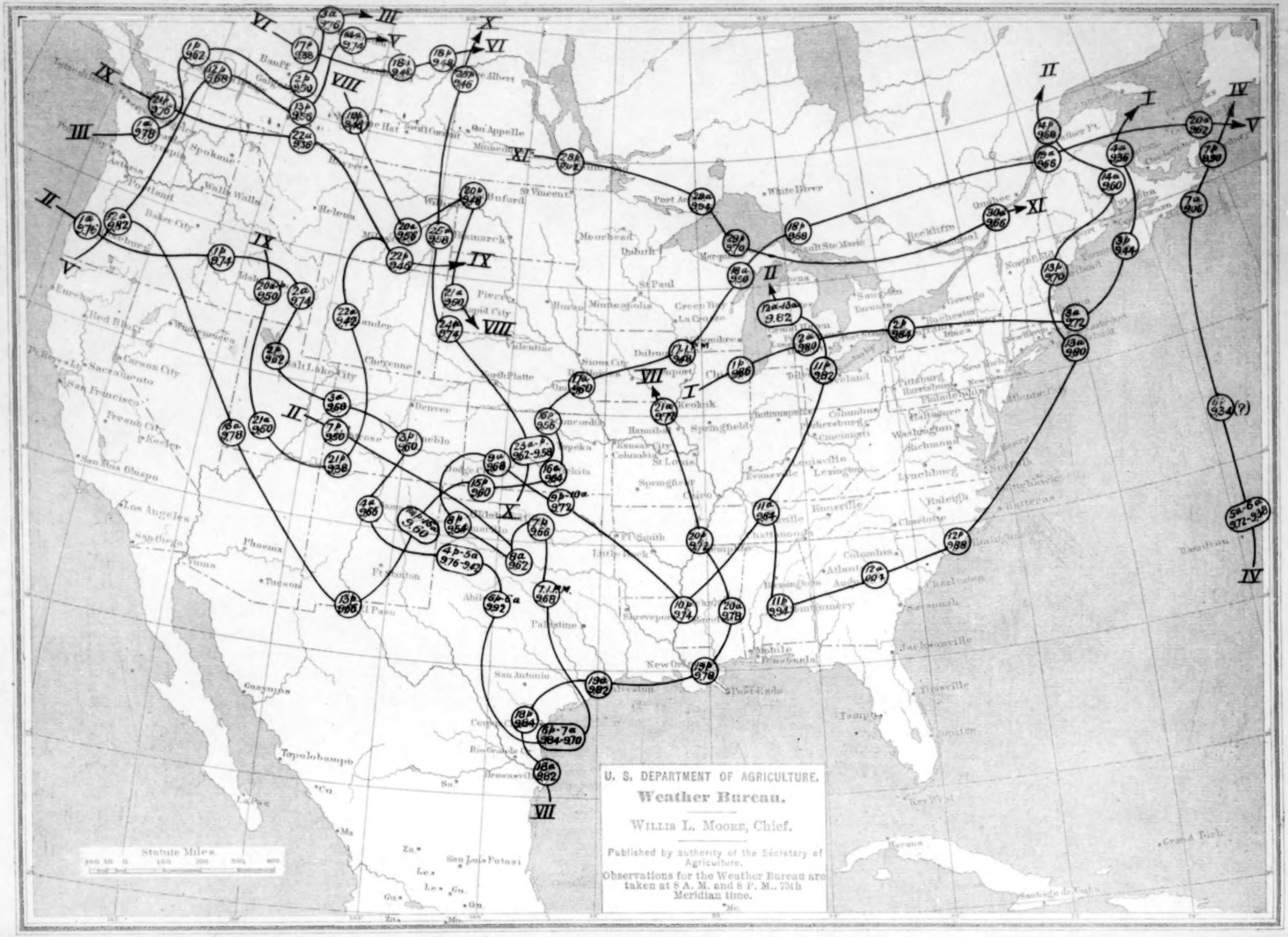
Chart II. Tracks of Centers of Low Areas. April, 1900.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Weather Bureau.
WILLIS L. MOORE, Chief.
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Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.

Chart III. Total Precipitation. April, 1900.

Chart III. Total Precipitation. April, 1900.

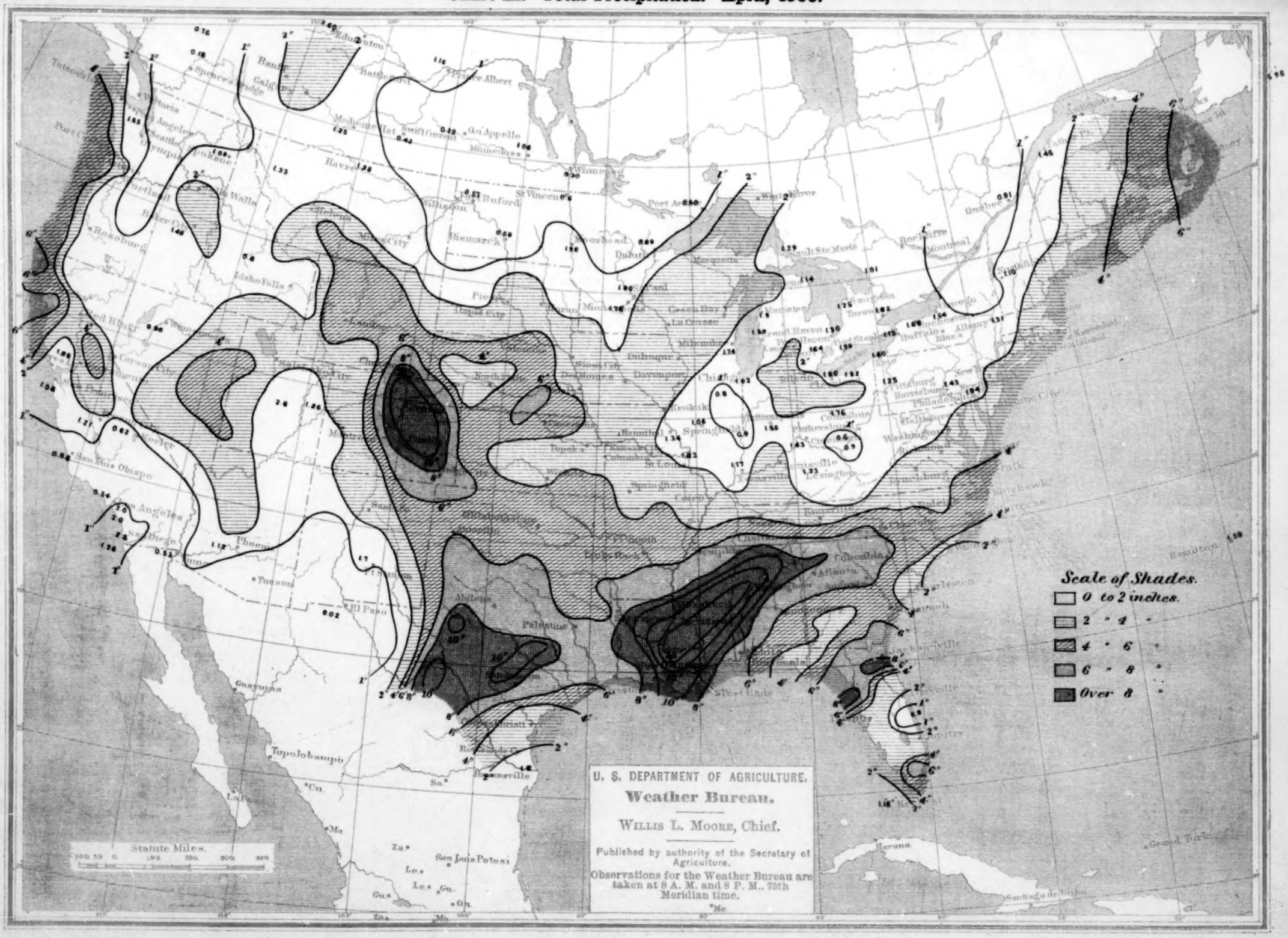
Scale of Shades.
0 to 2 inches.
2 " 4 "
4 " 6 "
6 " 8 "
Over 8 "
Statute Miles.
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
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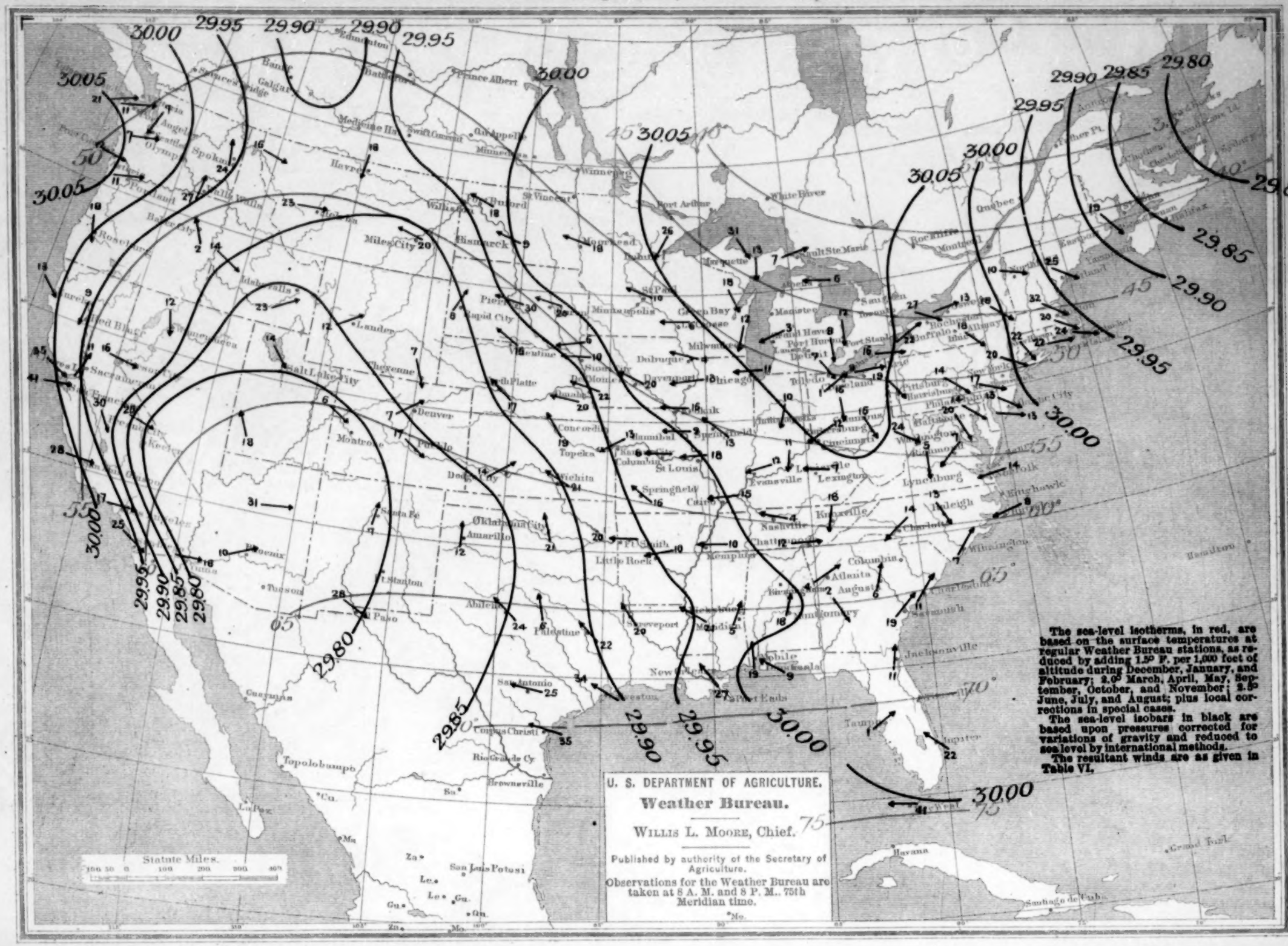
Chart IV. Sea-Level Pressure and Temperature; Resultant Surface Winds. April, 1900.



The sea-level isotherms, in red, are based on the surface temperatures at regular Weather Bureau stations, as reduced by adding 1.5° F. per 1,000 feet of altitude during December, January, and February; 2.0° March, April, May, September, October, and November; 2.5° June, July, and August; plus local corrections in special cases.

The sea-level isobars in black are based upon pressures corrected for variations of gravity and reduced to sea level by international methods.

The resultant winds are as given in Table VI.

Chart V. Hydrographs for Seven Principal Rivers of the United States. April, 1900.

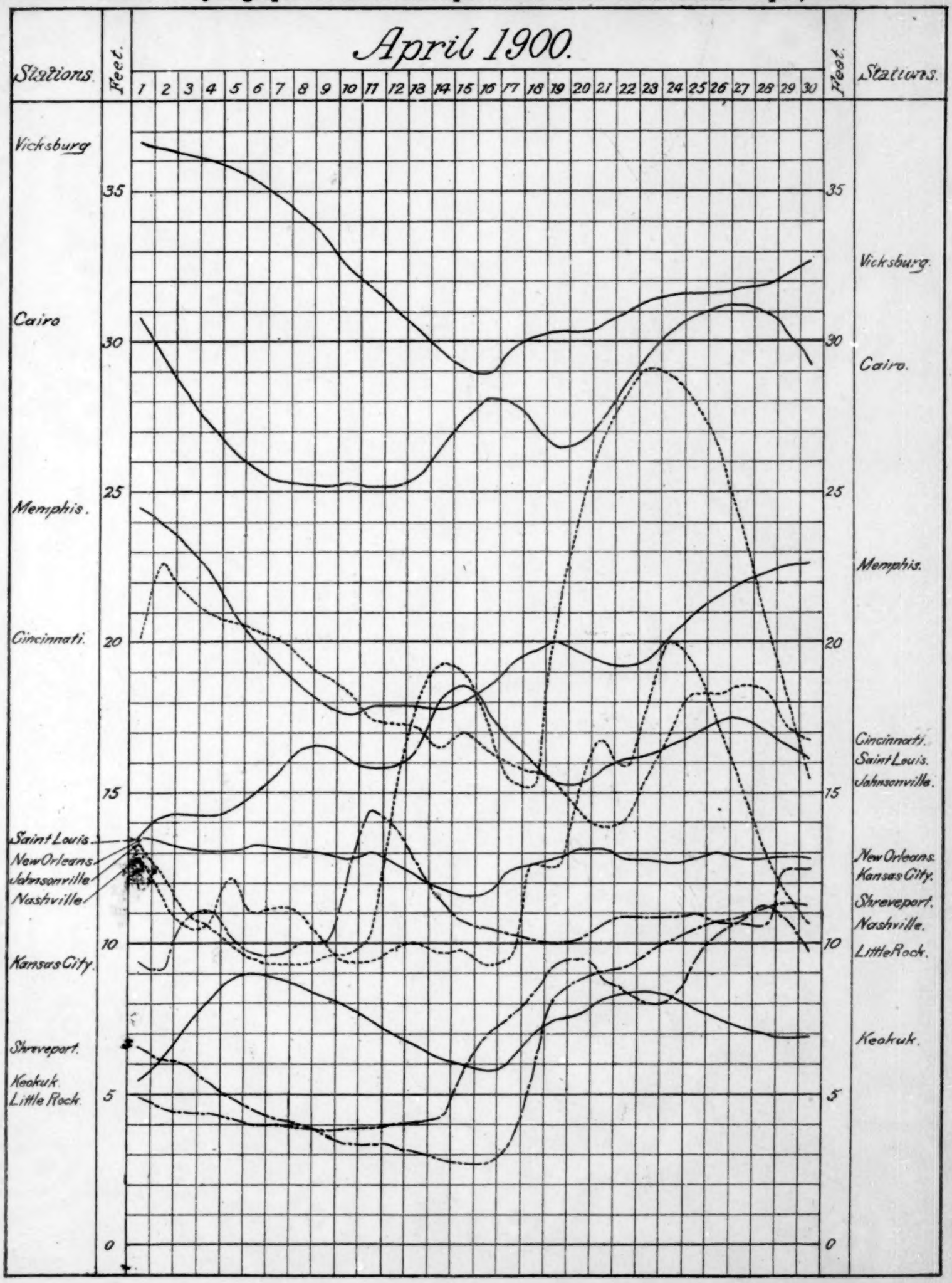
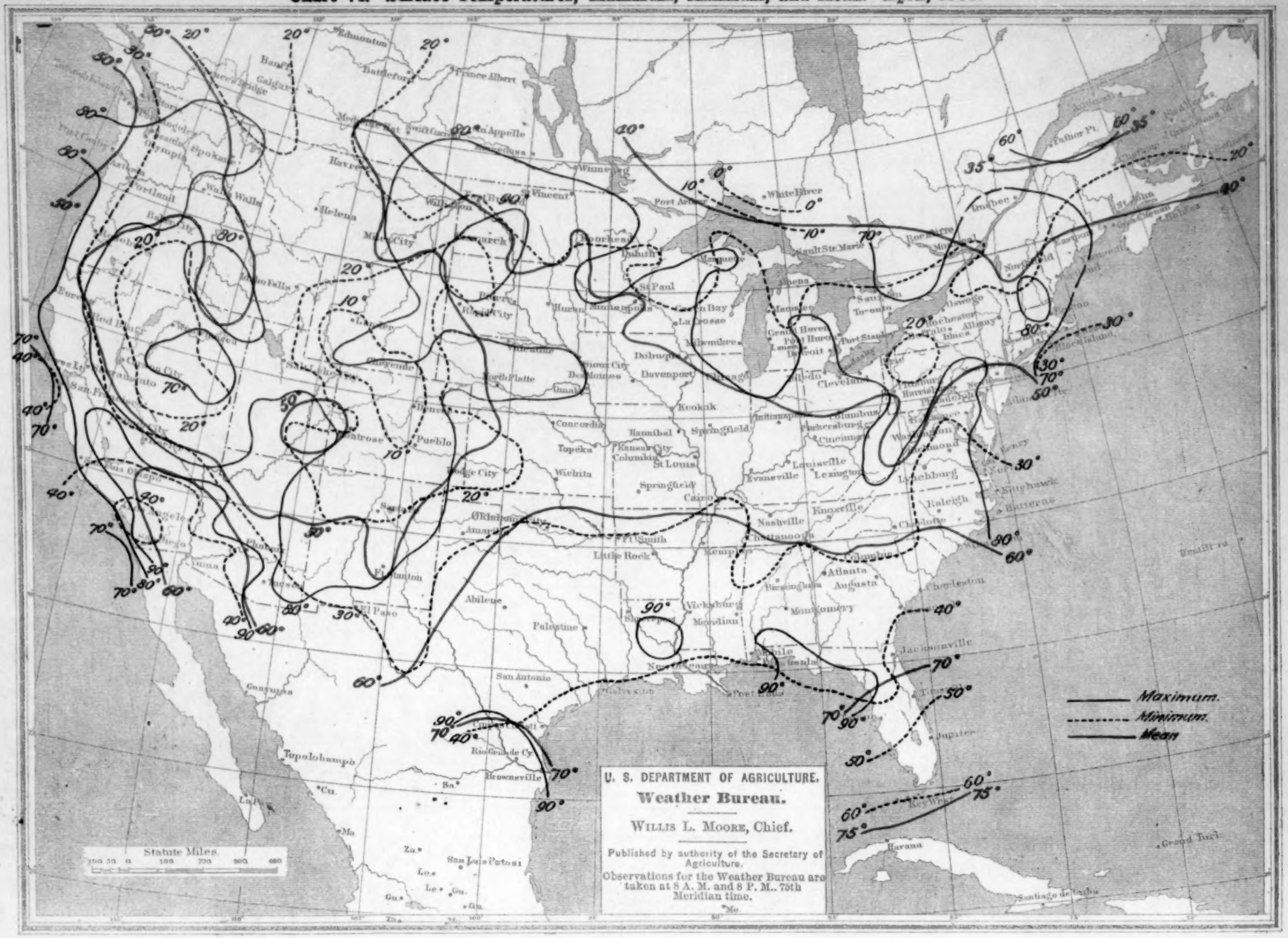


Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. April, 1900.


Maximum.
Minimum.
Mean
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Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.

Chart VII. Percentage of Sunshine. April, 1900.

Chart VII. Percentage of Sunshine. April, 1900.

Chart VIII. Total Snowfall for April, 1900.

Statute Miles.
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Weather Bureau.
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Chart IX. West Indian Monthly Isobars, Isotherms, and Resultant Winds. April, 1900.
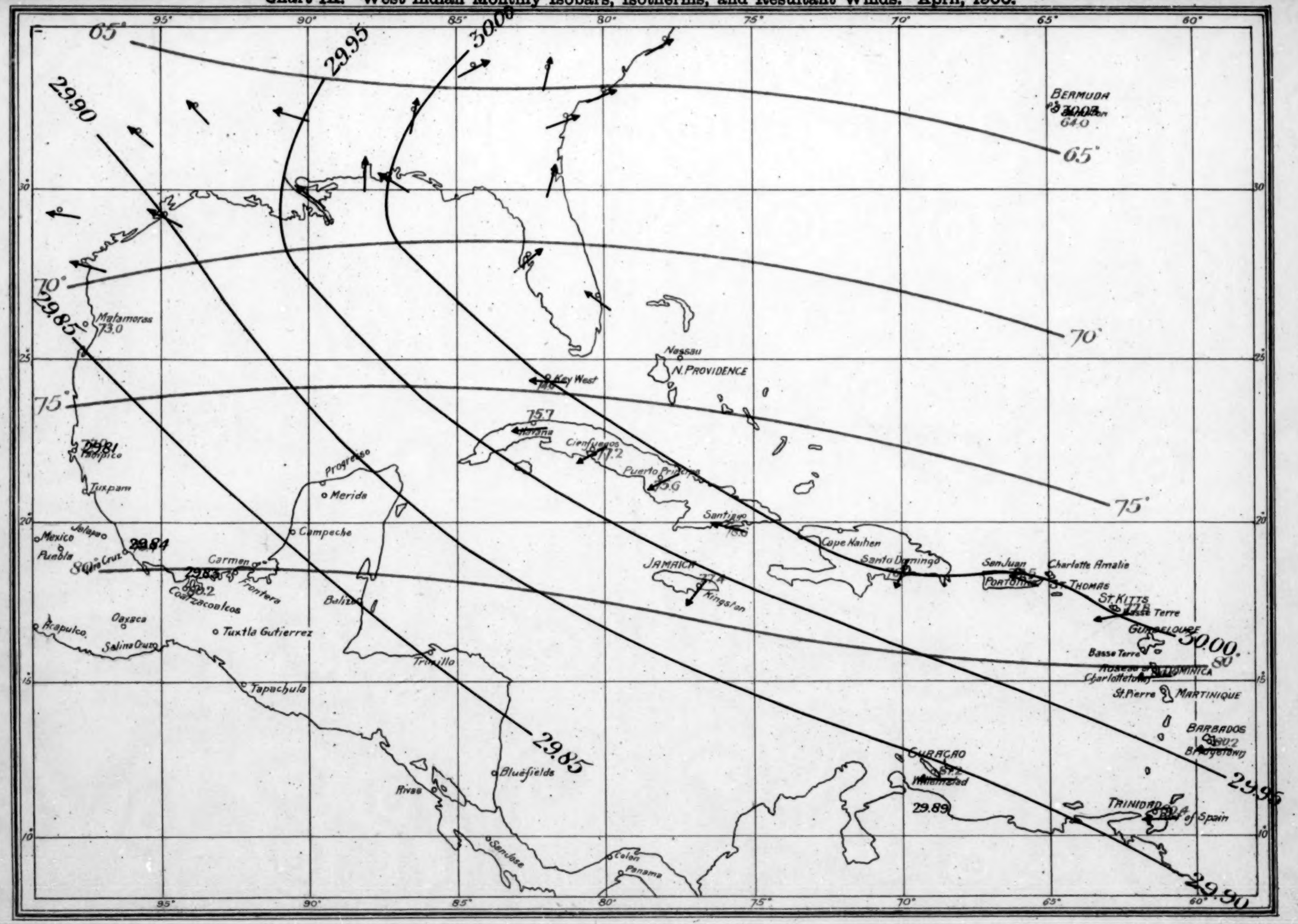
Chart IX. West Indian Monthly Isobars, Isotherms, and Resultant Winds. April, 1900.